United States
Department of
Agriculture

Soil
Conservation
Service

In cooperation with
the Louisiana Agricultural
Experiment Station and
the Louisiana Soil and
Water Conservation
Committee

Soil Survey of La Salle Parish, Louisiana

How To Use This Soil Survey

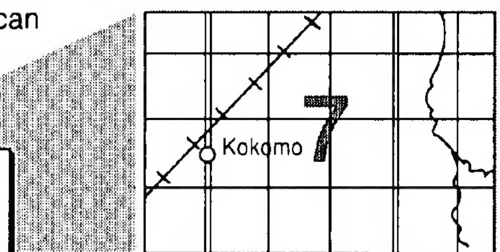
General Soil Map

The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

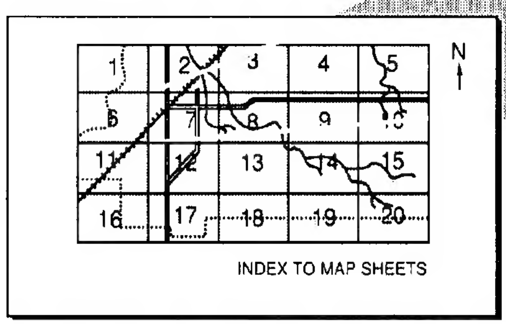
Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.



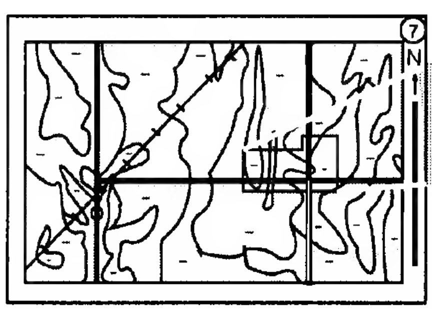
MAP SHEET

To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.

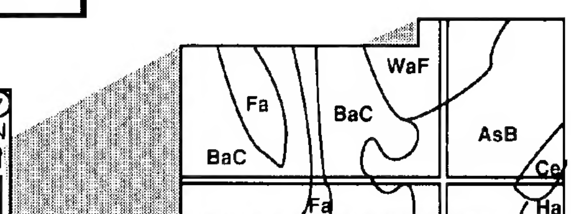


INDEX TO MAP SHEETS

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.



MAP SHEET



AREA OF INTEREST

NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1985. Soil names and descriptions were approved in 1986. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1986. This survey was made cooperatively by the Soil Conservation Service, the Louisiana Agricultural Experiment Station, and the Louisiana Soil and Water Conservation Committee. It is part of the technical assistance furnished to the La Salle Soil and Water Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

All programs and services of the Soil Conservation Service are offered on a nondiscriminatory basis, without regard to race, color, national origin, religion, sex, age, marital status, or handicap.

Cover: A small farm pond in a pastured area of Keithville very fine sandy loam, 1 to 5 percent slopes.

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Issued October 1991

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Foreword

This soil survey contains information that can be used in land-planning programs in La Salle Parish. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

Horace J. Austin
State Conservationist
Soil Conservation Service

Soil Survey of
La Salle Parish, Louisiana

By P. George Martin, Soil Conservation Service

Soils surveyed by P. George Martin and Burnell Muse, Soil Conservation Service, and
Marc J. Bordelon, Louisiana Soil and Water Conservation Committee

United States Department of Agriculture, Soil Conservation Service,
in cooperation with
the Louisiana Agricultural Experiment Station and the Louisiana Soil and Water
Conservation Committee

La Salle Parish is in the central part of Louisiana (fig. 1). It is bounded on the north by Caldwell Parish, on the east by Catahoula Parish, on the south by Avoyelles and Rapides Parishes, and on the west by Grant and Winn Parishes. Jena, the parish seat, is near the center of the parish, about 40 miles northeast of Alexandria. The total area of the parish is 423,490 acres, of which 407,620 acres is land and 15,870 acres is large and small areas of water in the form of lakes, bayous, ponds, and rivers.

The parish is mostly rural. It had a population of 17,004 in 1980. In that year, Jena had a population of about 4,300. The main communities are Jena, Olla, Uranis, Tullos, Trout, Goodpine, and Nebo.

Most of the acreage in the parish is used as woodland and as habitat for wildlife. A small acreage is used for cultivated crops or for pasture.

Elevation ranges from about 35 feet above sea level on a flood plain in the southern part of the parish to about 324 feet in an area on uplands in the northeastern part of the parish.

The parish is made up of three major physiographic areas—flood plains, low stream terraces, and uplands and high stream terraces.

The flood plains make up about 15 percent of the parish. They occur as level areas on natural levees and low terraces along the present and former channels of the Little River and other distributary channels of the Mississippi River and as low, level areas between natural levees and in backswamps. The soils on the highest parts of the natural levees are not flooded or are subject to rare flooding. They are loamy and are medium in fertility. They are used mainly for cultivated crops or woodland. Cotton and soybeans are the principal crops grown on these loamy soils. The soils on lower parts of the natural levees and in backswamps are occasionally or frequently flooded. They are clayey

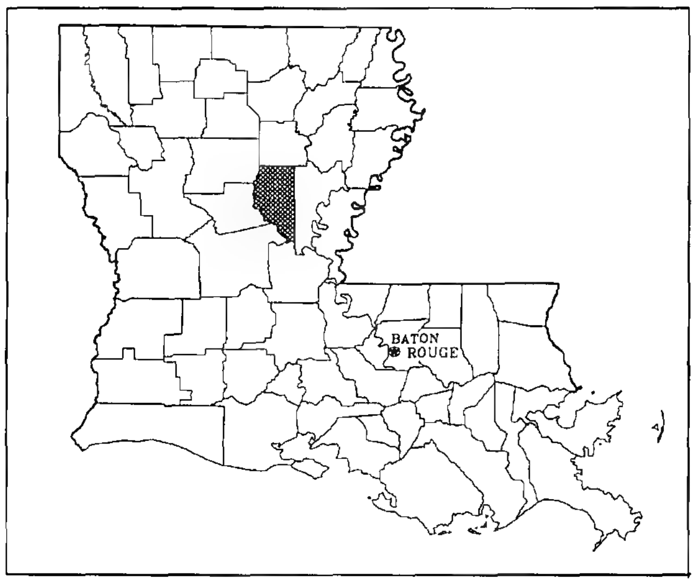

Figure 1.—Location of La Salle Parish in Louisiana.

and are high or medium in fertility. They are used as cropland, pasture, woodland, or wildlife habitat. Soybeans and grain sorghum are the principal crops grown on these clayey soils. Drainage and flood-control systems generally are needed.

Level and nearly level soils on low stream terraces make up about 14 percent of the parish. These soils are mainly in the southern part of the parish. They are subject to flooding by backwater unless protected by a levee system. Generally, they are acid throughout and are low in fertility. On a large acreage the subsoil of these soils has a high content of sodium, which limits the growth of some plants. Most areas are used as hardwood forests and as wildlife habitat. A small acreage is used as pasture or cropland.

Level to steep soils on uplands and high stream terraces make up about 71 percent of the parish. In most areas the terraces and uplands are dissected by well defined drainageways. The soils range from loamy to clayey. They are generally acid throughout and are low or medium in fertility. Plants on these soils respond well to additions of lime and fertilizer. The rooting depth is limited in some areas by a fragipan or sandstone bedrock. Most areas are used as woodland. A small acreage is used for pasture, cultivated crops, or urban development.

This soil survey updates the survey of La Salle Parish published in 1920 *(38)*. It provides additional information and has larger maps, which show the soils in greater detail.

General Nature of the Parish

This section gives general information about the parish. It describes climate, early history, agriculture, industry, transportation facilities, and water resources. Catahoula Lake also is described.

Climate

Prepared by the National Climatic Data Center, Asheville, North Carolina.

Table 1 gives data on temperature and precipitation for the survey area as recorded at the Belah fire tower in the period 1952 to 1981. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 49 degrees F and the average daily minimum temperature is 38 degrees. The lowest temperature on record, which occurred on January 12, 1962, is 6 degrees. In summer, the average temperature is 81 degrees and the average daily maximum temperature is 93 degrees. The highest recorded temperature, which occurred on August 6, 1964, is 106 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is nearly 58 inches. Of this, about 28 inches, or nearly 50 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 21 inches. The heaviest 1-day rainfall, which occurred on April 29, 1953, is 9.5 inches. Thunderstorms occur on about 54 days each year.

Snowfall is rare. In 50 percent of the winters, there is no measurable snowfall. In 15 percent the snowfall, usually of short duration, is more than 2 inches. The heaviest 1-day snowfall on record is more than 5 inches.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 85 percent. The sun shines 70 percent of the time possible in summer and 50 percent in winter. The prevailing wind is from the south. Average windspeed is highest, 11 miles per hour, in spring.

Early History

La Salle Parish was established as a governmental unit in 1908, when it was formed out of the western half of Catahoula Parish. The new parish was named La Salle in honor of the French explorer who claimed all lands drained by the Mississippi River for France in 1682 *(26)*. The first settlers built homes on the bluffs on the western shore of Catahoula Lake in the late 1700's. By the late 1820's, many of the hilly uplands were settled, mostly by people from the lower Atlantic and Eastern Gulf States.

The settlers grew a variety of crops and raised livestock for subsistence. Early occupations, in order of their importance, were raising livestock and farming, logging, and furnishing wood to fuel steamboats.

Agriculture

Raising livestock and farming are important in La Salle Parish, but they are not major enterprises. The acreage used for cultivated crops is limited. Only about 6,900 acres is used for soybeans, cotton, grain

sorghum, or corn. Most of this acreage is in areas of fertile alluvial soils along the French Fork of the Little River. The production of livestock, primarily cattle and hogs, is important. Approximately 11,800 acres of improved pasture is in scattered areas throughout the parish. Most of the woodland in the parish is unfenced and provides good-quality grazing to many cattle and hogs.

The trend in agriculture in the parish is toward fewer and larger farms. The acreage of cropland is decreasing, and the acreage of pasture is slightly increasing.

Industry

La Salle Parish is one of the leading timber producers in the state. Approximately 88 percent of the total land area is woodland. The forestry industry is the mainstay of the economy *(25, 27)*. The commercial timber products include sawlogs, pulpwood, poles, piling, and posts. Both softwoods and hardwoods are used in several industries, including sawmills, creosote plants, and a particle board and plywood plant *(25)*.

Industrial development has been slow, but a number of industries operate in the parish. Since oil was first discovered at the Tullos-Urania Pool in 1925, La Salle Parish has been one of the more prolific oil-producing parishes in Louisiana *(19, 25, 27)*. Many oil and gas fields are in scattered areas throughout the parish, and drilling remains active. The oil and gas industry provides employment for many people. Also, a few local manufacturers produce tools and material used in this industry.

Also important in the parish are industries that manufacture wire and cable. These industries provide employment for many people.

Transportation Facilities

La Salle Parish has two United States highways and numerous hard-surfaced state and parish roads. Large timber companies and oil production companies maintain an extensive network of gravel roads throughout the parish. A railroad provides freight service to Jena, Tullos, and Olla. Airports near Jena and Olla serve small private and commercial aircraft. The parish has no navigable waterways.

Water Resources

La Salle Parish has more than 16,000 acres of surface water *(27)*. Catahoula lake is the largest area of surface water. It has a widely fluctuating water level, however, and is not a dependable source. Saline Lake, at the southern tip of the parish, is the second largest lake. The main streams in the parish are the Little River, which forms most of the western boundary, and Bayou Funny Louis, Chickasaw Creek, Castor Creek, Hemphill Creek, Trout Creek, Saline Bayou, Muddy Bayou, the Old River, Hurricane Creek, and French Fork.

Most of the ground water used in La Salle Parish is obtained from deposits of Pleistocene-age sand and gravel on uplands in the central part of the parish *(29)*. Small amounts of water are obtained from sandy material of Eocene, Miocene, and Pleistocene age in the northern part of the parish and from Pleistocene-age valley deposits in the southern part.

The Pleistocene deposits on uplands range from 100 to 150 feet in thickness in the central part of the parish. They are only 30 to 50 feet thick in other areas. Wells screened in the lower parts of these deposits are reported to yield as much as 150 gallons per minute. Most domestic wells are 25 to 100 feet deep and yield 2 to 15 gallons per minute. The water is soft or moderately hard and is typically low in content of chloride and high in content of iron. Municipal supplies for Jena and Tullos are obtained from these deposits.

Ground water supplies are not available in a large part of northern La Salle Parish where clays of the Jackson Group and the Vicksburg Formation are exposed.

The municipal supply for Olla is obtained from sands in the Cockfield Formation, which crops out in the northwestern part of the parish. The water from these sands generally is soft and low in content of chloride, but it has a disagreeable color.

The Catahoula Formation, which crops out in the central part of the parish, supplies water of good quality to domestic wells in the outcrop area and in the southern part of the parish. Electric logs of oil test wells indicate that the depth to fresh water ranges from 270 feet below sea level in the outcrop area to 900 feet in the extreme southern part of the parish.

Catahoula Lake

Catahoula Lake, nestled against the western edge of the Mississippi River and the flood plains along the Red River, is the largest natural freshwater lake in Louisiana. It is prominent in the history of La Salle Parish. It has a surface area of about 35 square miles and is about 12 miles long and 3 to 4 miles wide. Its surface is at an elevation of about 30 feet. About 24 square miles of this lake is in La Salle Parish. Water level fluctuations, ranging from 0 to 30 feet, are a natural phenomenon and vary from year to year. Since 1972, these fluctuations have been partially controlled by a canal and structure managed by the United States

Fish and Wildlife Service and the Army Corps of Engineers. The diversion canal and water-control structure are designed mainly to maintain water levels that are in the best interests of waterfowl. An estimated 150,000 to 400,000 waterfowl winter on and around the lake each year.

The Little River and the smaller streams to the north and west flow into Catahoula Lake and drain a watershed of about 2,500 square miles. When water levels are high in the lake, excess water drains to the east and south through the Old River, French Fork, and several of the smaller bayous. When water levels are low, the lake drains only through the water-control structure and diversion canal. Catahoula Lake receives backwater from the Red, Black, Ouachita, and Mississippi Rivers. The water level of the lake depends on the seasonal flows of these rivers and on rainfall in the watershed.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; and the kinds of crops and native plants growing on the soils. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, the landforms, relief, climate, and the natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial

photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by several kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. These latter soils are called inclusions or included soils.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soil on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each unit on the general soil map is a unique natural landscape. Typically, it consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

The descriptions, names, and delineations of the soils on the general soil map of this parish do not fully agree with those on the maps of Avoyelles, Catahoula, Grant, and Rapides Parishes. Differences are the result of a better knowledge of soils, modifications in series concepts, and variations in the intensity of mapping or in the extent of soils in the parishes.

Soil Descriptions

Areas on Flood Plains Dominated by Level, Loamy and Clayey Soils

These are well drained, somewhat poorly drained, poorly drained, and very poorly drained soils that are loamy or clayey throughout. They make up about 12.2 percent of the parish. Most areas that are not flooded or are seldom flooded are used for crops or pasture. Most areas that are frequently flooded are used as woodland. Seasonal wetness and the hazard of flooding are the main management concerns affecting most uses.

1. Dundee

Level, somewhat poorly drained soils that are loamy throughout

This map unit consists of soils in high positions on natural levees along old distributary channels of the Mississippi River. The levees protect the soils from flooding. The landscape in most areas is one of long, smooth slopes. Slopes are 0 to 1 percent.

This map unit makes up about 0.7 percent of the parish. It is about 85 percent Dundee soils and 15 percent soils of minor extent.

The Dundee soils have a surface layer of dark grayish brown loam. The subsoil is grayish brown, mottled clay loam. The substratum is grayish brown, mottled very fine sandy loam.

Of minor extent are the poorly drained Alligator, Forestdale, and Sharkey and somewhat poorly drained Tensas soils in low positions.

Most areas of this map unit have been cleared and are used for crops. Cotton and soybeans are the main crops. A small acreage is used for pasture or is developed for homesites.

The soils in this map unit are well suited to cultivated crops and pasture. The loamy surface layer and level slopes favor these uses. Seasonal wetness is the main limitation, and medium fertility is a minor limitation. Land grading or smoothing and a surface drainage system are needed in places.

The soils in this map unit are well suited to woodland. The dominant trees are sweetgum, American sycamore, American elm, willow oak, Nuttall oak, and water oak. The main management concerns are a moderate equipment limitation, which is caused by wetness, and moderate competition from undesirable understory plants. These soils are well suited to habitat for woodland and openland wildlife.

The soils in this map unit are moderately well suited to building site development and sanitary facilities. The wetness, moderately slow permeability, and a moderate shrink-swell potential are the main limitations. Low strength is a limitation on sites for local roads and streets.

2. Guyton-Ouachita

Level, poorly drained and well drained soils that are loamy throughout

This map unit consists of soils on narrow flood plains along streams that drain the uplands. These soils are

frequently flooded. Slopes are less than 1 percent.

This map unit makes up about 8 percent of the parish. It is about 46 percent Guyton soils, 36 percent Ouachita soils, and 18 percent soils of minor extent.

The poorly drained Guyton soils have a surface layer of dark brown or dark grayish brown, mottled silt loam and a subsurface layer of grayish brown and gray, mottled silt loam. The subsoil is gray and grayish brown, mottled silt loam and silty clay loam.

The well drained Ouachita soils have a surface layer of dark brown silt loam. The subsoil is brown silt loam. The substratum is dark grayish brown, mottled silt loam.

Of minor extent are the somewhat excessively drained Bienville and well drained Cahaba soils on stream terraces and the well drained Jena soils on natural levees.

Most areas of this map unit are used as woodland. A few small areas are used as pasture or cropland.

The soils in this map unit are moderately well suited to the commercial production of hardwoods and pines. The dominant trees are loblolly pine, shortleaf pine, water oak, green ash, sweetgum, willow oak, and swamp chestnut oak. Wetness and flooding severely restrict the use of equipment during winter and spring and cause moderate seedling mortality. Also, plant competition is moderate, and compaction can occur if the trees are logged when the soils are wet or moist. These soils are well suited to habitat for woodland and wetland wildlife.

The soils in this map unit are poorly suited to cultivated crops and pasture. The choice of suitable crops and pasture plants and the period of grazing are limited because of the wetness and the frequency and duration of flooding. Low fertility and a potentially toxic level of aluminum in the root zone are additional management concerns. Surface drainage systems and flood-control measures are needed.

The soils in this map unit are poorly suited to urban uses. They generally are not suitable as sites for dwellings. The wetness and the flooding are severe limitations. Other limitations are slow or moderately slow permeability on sites for sanitary facilities and low strength on sites for local roads and streets.

3. Alligator-Sharkey-Fausse

Level, poorly drained and very poorly drained soils that have a clayey surface layer and a clayey subsoil

This map unit consists of clayey soils in low positions, on broad flats, and in depressions, such as old channel scars, on alluvial plains. These soils are frequently or occasionally flooded. Some areas are ponded most of the time. Slopes are less than 1 percent.

This map unit makes up about 3.5 percent of the parish. It is about 45 percent Alligator soils, 30 percent Sharkey soils, 20 percent Fausse soils, and 5 percent soils of minor extent.

The poorly drained Alligator soils are on broad flats and in low positions. They have a surface layer of dark grayish brown, mottled clay. The subsoil is gray, mottled clay.

The poorly drained Sharkey soils are on broad flats and in low positions. They have a surface layer of dark gray, mottled clay. The subsoil is dark gray and gray, mottled clay. The substratum is stratified dark gray and gray, mottled silty clay loam and silt loam.

The very poorly drained Fausse soils are in depressions, such as old channel scars. They are ponded for long periods and remain wet throughout the year. The surface is covered with a thin mat of decomposing leaves and grasses. The surface layer is dark gray clay. The subsoil is dark gray and gray, mottled clay. The substratum is gray, mottled clay.

Of minor extent are the somewhat poorly drained Dundee soils in high positions on natural levees and the poorly drained Forestdale and somewhat poorly drained Tensas soils in low positions.

Most areas of this map unit are wooded and are used as habitat for wildlife. A few large areas have been cleared and are used for crops or pasture. Soybeans and grain sorghum are the main crops.

The soils in this map unit are poorly suited to woodland. The dominant trees are overcup oak, Nuttall oak, sugarberry, honeylocust, water hickory, baldcypress, black willow, and green ash. Flooding, ponding, the clayey surface layer, and wetness severely restrict the use of equipment during winter and spring and cause moderate seedling mortality. Also, compaction and the formation of ruts are hazards, and competition from understory plants is moderate. These soils are well suited to habitat for woodland and wetland wildlife.

The soils in this map unit generally are poorly suited to crops and pasture. The Fausse soils generally are not suited to crops. Flooding, ponding, and wetness are the main management concerns. The choice of suitable crops and pasture grasses and the period of grazing are severely limited because of the wetness and the frequency and duration of flooding.

The soils in this map unit are poorly suited to most urban uses. They are not suited to building site development. Flooding, ponding, and wetness severely limit urban uses. Additional limitations are a very high

shrink-swell potential, very slow permeability, and low strength, which affects local roads and streets.

Areas on Flood Plains and Low Stream Terraces Dominated by Level and Nearly Level, Loamy Soils

These are somewhat poorly drained and poorly drained soils that have a loamy surface layer and a clayey and loamy or a loamy subsoil. They make up about 16.8 percent of the parish. Most of the acreage is used as woodland. A few large areas that are rarely or occasionally flooded are used for crops or pasture. Wetness and flooding, which limit the use of equipment and increase the seedling mortality rate and the risks of rut formation and compaction, are the main concerns in managing woodland. Wetness, flooding, low or medium fertility, and a potentially toxic level of aluminum in the root zone are limitations in the areas used for crops or pasture.

4. Bursley-Forestdale-Foley

Level, poorly drained soils that have a loamy surface layer and a loamy or a clayey and loamy subsoil

This map unit consists of soils on low stream terraces that are at the elevation of flood plains. The landscape mainly is one of low, broad flats. Most areas are occasionally flooded, but some areas at the slightly higher elevations are only rarely flooded. Slopes are less than 1 percent.

This map unit makes up about 9 percent of the parish. It is about 37 percent Bursley soils, 28 percent Forestdale soils, 25 percent Foley soils, and 10 percent soils of minor extent.

The Bursley soils have a surface layer of dark grayish brown silt loam and a subsurface layer of grayish brown and light brownish gray silt loam. The upper part of the subsoil is grayish brown, mottled silt loam. The next part is mottled grayish and brownish silty clay loam. The lower part is grayish and brownish, mottled clay loam and loam.

The Forestdale soils have a surface layer of dark grayish brown or light brownish gray silty clay loam. The upper part of the subsoil is gray, mottled silty clay. The next part is gray, mottled silty clay loam. The lower part is light brownish gray, mottled silt loam and silty clay loam.

The Foley soils have a surface layer of dark grayish brown silt loam. The subsurface layer and the upper part of the subsoil are light brownish gray, mottled silt loam. The next part of the subsoil is grayish brown, mottled silty clay loam. The lower part is light olive gray, mottled silty clay loam. The subsoil has concentrations of sodium salts.

Of minor extent are the somewhat poorly drained Deerford soils in the slightly higher positions on the landscape and the very poorly drained Fausse and poorly drained Sharkey soils in low positions and in depressions.

Most areas of this map unit are wooded and are used as habitat for wildlife. A small acreage is used for pasture or cropland or is developed for homesites.

The soils in this map unit are moderately well suited to woodland. The dominant trees are Nuttall oak, willow oak, overcup oak, water hickory, and green ash. Baldcypress and sugarberry also are common in areas that are occasionally flooded. Logging is generally limited to the summer and fall because of the wetness and flooding during winter and spring. Because of the wetness, the seedling mortality rate is slight or moderate. Plant competition and the risk of compaction also are management concerns. Excess sodium in the Foley soils can hinder the growth of some trees. All three soils are well suited to habitat for woodland and wetland wildlife.

Most of the soils in this map unit are moderately well suited to cultivated crops or pasture, but the soils that are occasionally flooded are poorly suited to crops. Flooding and wetness are the main limitations. The choice of suitable crops and pasture grasses and the period of grazing are limited because of the wetness and the frequency and duration of flooding. Other limitations are low or medium fertility, a potentially toxic level of aluminum in the root zone, and poor tilth. The high content of sodium in the Foley soils hinders plant growth. Surface drainage and flood-control measures are needed.

The soils in this map unit are poorly suited to most urban uses. The soils that are occasionally flooded generally are not suitable as homesites. The main management concerns are the rare or occasional flooding and the wetness. Other limitations are slow or very slow permeability, a moderate or high shrink-swell potential, and low strength, which affects local roads and streets. Also, the excess sodium in the Foley soils can limit the choice of lawn grasses and ornamentals.

5. Deerford-Forestdale

Level, somewhat poorly drained and poorly drained soils that have a loamy surface layer and a loamy or a clayey and loamy subsoil

This map unit consists of loamy soils on low stream terraces at the elevation of flood plains. The landscape is mainly one of low, slightly convex ridges and broad flats. These soils are subject to rare or occasional flooding. Slopes are less than 1 percent.

This map unit makes up about 3.8 percent of the parish. It is about 50 percent Deerford soils, 37 percent

Forestdale soils, and 13 percent soils of minor extent.

The somewhat poorly drained Deerford soils are on low, slightly convex ridges. These soils have a surface layer and subsurface layer of grayish brown silt loam. The upper part of the subsoil is mottled grayish brown, yellowish brown, and brown silty clay loam and silt loam. The lower part is mottled grayish brown, yellowish brown, brown, and strong brown loam.

The poorly drained Forestdale soils are in low areas and on broad flats. These soils have a surface layer of dark grayish brown and light brownish gray silty clay loam. The upper part of the subsoil is gray, mottled silty clay. The next part is gray, mottled silty clay loam. The lower part is light brownish gray, mottled silt loam and silty clay loam.

Of minor extent are the poorly drained Bursley and Foley soils in low positions and the very poorly drained Fausse soils in depressions.

Most areas of this map unit are wooded and are used as habitat for wildlife. A small acreage is used for pasture or cultivated crops or is developed for homesites.

The soils in this map unit are moderately well suited to woodland. The dominant trees are willow oak, cedar elm, water oak, Nuttall oak, and sweetgum. Overcup oak, water hickory, sugarberry, baldcypress, and green ash also are dominant trees on the Forestdale soils. Logging is generally limited to summer and fall because of the wetness and flooding during winter and early spring. Other management concerns are a slight or moderate seedling mortality rate, severe plant competition, and severe risks of rut formation and compaction. Excess sodium in the Deerford soils can hinder tree growth. Both soils are well suited to habitat for woodland and wetland wildlife.

Most of the soils in this map unit are moderately well suited to cultivated crops or pasture, but the soils that are occasionally flooded are poorly suited to crops. The wetness and the flooding are the main limitations. A surface drainage system is needed to remove excess water. The high content of sodium in the subsoil of the Deerford soils hinders plant growth. Other limitations are low or medium fertility, a potentially toxic level of aluminum in the root zone, and poor tilth. The choice of suitable crops and pasture grasses is limited in low areas that are occasionally flooded.

The soils in this map unit are poorly suited to most urban uses. The soils that are occasionally flooded generally are not suitable as homesites. The main limitations are the wetness, slow or very slow permeability, a moderate or high shrink-swell potential, and low strength, which affects local roads and streets. Also, the excess sodium in the Deerford soils can limit the choice of lawn grasses and ornamentals.

6. Una-Zenoria

Level and nearly level, poorly drained soils that have a loamy surface layer and a clayey and loamy or a loamy subsoil

This map unit consists of soils on flood plains and on low stream terraces that are at the elevation of flood plains. These soils are frequently or occasionally flooded. Slopes range from 0 to 2 percent.

This map unit makes up about 4 percent of the parish. It is about 58 percent Una soils, 14 percent Zenoria soils, and 28 percent soils of minor extent.

The Una soils are on flood plains. They have a surface layer of very dark grayish brown silty clay loam and a subsurface layer of dark grayish brown silty clay loam. The upper part of the subsoil is mottled dark gray, gray, and light brownish gray silty clay. The lower part is mottled light brownish gray silty clay loam.

The Zenoria soils are on low stream terraces. They have a surface layer of dark grayish brown clay loam and a subsurface layer of dark gray, mottled clay. The subsoil is grayish brown and light brownish gray, mottled sandy clay loam, fine sandy loam, and loam. The substratum is mottled light brownish gray and light olive brown loamy fine sand and fine sand.

Of minor extent are the somewhat excessively drained Bienville and well drained Cahaba soils on the higher terraces, the very poorly drained Fausse soils in depressions on flood plains, and the poorly drained Guyton soils in level areas on the flood plains.

Most areas of this map unit are used as woodland. A few small areas are used as pasture.

The soils in this map unit generally are poorly suited to woodland. The dominant trees are overcup oak, water hickory, and baldcypress on the Una soils and willow oak, Nuttall oak, and sweetgum on the Zenoria soils. The wetness and the flooding restrict the use of equipment and cause moderate or severe seedling mortality. Also, plant competition is moderate, and the soils are subject to rut formation and compaction. These soils are moderately well suited to habitat for woodland and wetland wildlife.

The soils in this map unit are poorly suited to cultivated crops and pasture. The choice of suitable crops and pasture plants and the period of grazing are limited because of the wetness and the frequency and duration of flooding. Other limitations are poor tilth, low fertility, and a potentially toxic level of aluminum in the root zone.

The soils in this map unit are poorly suited to urban uses. They are not suitable for homesite development because of the flooding. Other limitations are slow or very slow permeability, a seasonal high water table, a

high or very high shrink-swell potential, and low strength, which affects local roads and streets.

Areas on Stream Terraces and on Uplands Dominated by Level to Moderately Sloping, Loamy Soils

These are moderately well drained, somewhat poorly drained, and poorly drained soils that are loamy throughout. They make up about 4 percent of the parish. Most of the acreage is used as woodland. A small acreage is used for pasture or cultivated crops or is developed for homesites. Flooding and wetness limit the use of equipment and increase the seedling mortality rate and the risks of rut formation and compaction in wooded areas. Erosion, low or medium fertility, and a potentially toxic level of aluminum in the root zone are management concerns in the areas used for crops or pasture.

7. Frizzell-Providence-Guyton

Level to moderately sloping, somewhat poorly drained, moderately well drained, and poorly drained soils that are loamy throughout

This map unit consists of soils that are mainly on broad flats on stream terraces and uplands and on ridgetops and side slopes in the uplands. In some areas the soils are on narrow flood plains. The landscape is mainly one of broad, level areas and convex ridgetops and side slopes, which are crossed by a few narrow drainageways. Slopes range from 0 to 8 percent.

This map unit makes up about 4 percent of the parish. It is about 57 percent Frizzell soils, 24 percent Providence soils, 16 percent Guyton soils, and 3 percent soils of minor extent.

The somewhat poorly drained Frizzell soils are on broad flats on stream terraces. They have a surface layer of dark grayish brown silt loam. The subsurface layer is brown, mottled silt loam. The subsoil is yellowish brown, light gray, and dark brown, mottled silt loam and silty clay loam.

The moderately well drained Providence soils are in very gently sloping to moderately sloping areas on ridgetops and side slopes. These soils have a surface layer of very dark grayish brown silt loam. The next layer is dark brown silt loam. The upper part of the subsoil is yellowish red silty clay loam and strong brown silt loam. The lower part is a fragipan of strong brown and dark brown, mottled silt loam, loam, and sandy loam.

The poorly drained Guyton soils are on broad flats and on narrow flood plains along streams. They have a surface layer of dark grayish brown and dark brown silt loam. The subsurface layer is grayish brown and gray, mottled silt loam. The subsoil is gray and grayish brown, mottled silt loam and silty clay loam.

Of minor extent are the somewhat excessively drained Bienville and well drained Cahaba soils on stream terraces; the moderately well drained Keithville, Libuse, Malbis, Shatta, and Tippah soils on ridgetops and side slopes in the uplands; and the somewhat poorly drained Falkner soils on broad ridgetops in the uplands.

Most areas of this map unit are used as woodland. A small acreage is used for pasture or cultivated crops or is developed for homesites.

The soils in this map unit generally are well suited to woodland. The Guyton soils, however, are only moderately well suited. The main management concerns are wetness and flooding. The soils have a high potential for the production of loblolly pine. Logging during winter and early spring can be restricted by wetness, and compaction can occur if the trees are logged when the soils are wet or moist. The wetness causes moderate seedling mortality, and competition from undesirable understory plants is moderate or severe. These soils are well suited to habitat for woodland wildlife.

The soils in this map unit generally are moderately well suited to cultivated crops and well suited to pasture. The Guyton soils on flood plains, however, are poorly suited because of frequent flooding. The wetness is a limitation in the level soils, and erosion is a hazard on the very gently sloping to moderately sloping soils. Low or medium fertility is a minor limitation.

The Frizzell and Providence soils are moderately well suited to urban uses, but the Guyton soils are poorly suited. The main management concerns are the wetness, slow or moderately slow permeability, and low strength, which affects local roads and streets. Also, the Guyton soils are rarely or frequently flooded.

Areas on Uplands Dominated by Nearly Level to Steep, Loamy and Clayey Soils

These are well drained, moderately well drained, and somewhat poorly drained soils that have a loamy or clayey surface layer and a loamy, a clayey, or a loamy and clayey subsoil. They make up about 67 percent of the parish. Most of the acreage is used as woodland. Erosion is the main hazard. Wetness, which limits the use of equipment and increases the risk of compaction, is the main limitation.

8. Ruston-Pheba-Savannah

Nearly level to moderately sloping, well drained,

somewhat poorly drained, and moderately well drained soils that are loamy throughout

This map unit consists of soils on broad or narrow, convex ridgetops and on side slopes in the uplands. The landscape in most areas is one of long, smooth slopes. Slopes range from 0 to 8 percent.

This map unit makes up about 16 percent of the parish. It is about 51 percent Ruston soils, 16 percent Pheba soils, 13 percent Savannah soils, and 20 percent soils of minor extent.

The well drained Ruston soils are in very gently sloping to moderately sloping areas on narrow, convex ridgetops and on side slopes. These soils have a surface layer of very dark grayish brown fine sandy loam. The subsurface layer is brown fine sandy loam. The subsoil is mainly red sandy clay loam and fine sandy loam, but it has layers of clay loam and loamy sand.

The somewhat poorly drained Pheba soils are on broad, nearly level ridgetops. They have a surface layer of dark grayish brown loam. The subsurface layer is grayish brown loam. The upper part of the subsoil is yellowish brown loam and light brownish gray, mottled fine sandy loam and very fine sandy loam. The lower part is a fragipan of yellowish brown and brown, mottled loam.

The moderately well drained Savannah soils are in gently sloping areas on broad ridgetops and on side slopes. These soils have a surface layer of dark grayish brown fine sandy loam. The subsurface layer is light yellowish brown fine sandy loam. The upper part of the subsoil is yellowish brown, mottled fine sandy loam and loam. The lower part is a fragipan of mottled strong brown, yellowish brown, and light brownish gray sandy clay loam and loam.

Of minor extent are the poorly drained Guyton soils on narrow flood plains and in depressions, the moderately well drained Malbis and Providence and well drained Lexington soils on ridgetops, and the well drained Smithdale soils on side slopes.

Most areas of this map unit are used as woodland. A moderately large acreage is used as pasture, and a small acreage is used for cultivated crops or is developed for homesites.

The soils in this map unit are well suited to woodland. They have a high potential for the production of loblolly pine. Logging during winter and early spring can be limited by the wetness of the Pheba soils. Other management concerns are moderate plant competition and the risks of rut formation and compaction. All three soils are well suited to habitat for woodland wildlife.

The soils in this map unit are moderately well suited to cultivated crops and well suited to pasture. Wetness is a limitation in the nearly level soils, and erosion is a hazard on the more sloping soils. Low fertility and a potentially toxic level of aluminum in the root zone are additional management concerns.

The soils in this map unit are moderately well suited to most urban uses. The main limitations are moderate or moderately slow permeability, the wetness, and the slope. Low strength is a limitation on sites for local roads and streets.

9. Falkner-Tippah-Bayoudan

Nearly level to steep, somewhat poorly drained and moderately well drained soils that have a loamy or clayey surface layer and a loamy and clayey or a clayey subsoil

This map unit consists of soils on ridgetops and side slopes in the uplands. The landscape is generally one of broad, nearly level and gently sloping ridgetops and moderately sloping to steep side slopes. Slopes range from 0 to 40 percent.

This map unit makes up about 21 percent of the parish. It is about 37 percent Falkner soils, 34 percent Tippah soils, 14 percent Bayoudan soils, and 15 percent soils of minor extent.

The somewhat poorly drained, nearly level Falkner soils are on broad, slightly convex ridgetops. They have a surface layer of dark grayish brown silt loam. The upper part of the subsoil is yellowish brown, mottled silt loam. The lower part is mottled yellowish brown and grayish brown silty clay and silty clay loam.

The moderately well drained, gently sloping Tippah soils are on convex ridgetops and side slopes. They have a surface layer of yellowish brown silt loam. The subsoil is strong brown and yellowish red, mottled silt loam in the upper part; mottled yellowish brown, light brownish gray, light yellowish brown, and red silty clay in the next part; and pale olive, mottled silty clay in the lower part.

The moderately well drained, gently sloping to steep Bayoudan soils are on ridgetops and side slopes. They have a surface layer of very dark grayish brown clay, dark brown silty clay loam, or dark grayish brown silt loam. In sequence downward, the subsoil is red, mottled clay; yellowish brown, mottled clay; light olive brown, mottled clay; and grayish brown and yellowish brown clay.

Of minor extent are the poorly drained Guyton soils on narrow flood plains; the somewhat poorly drained Falkner soils on nearly level ridgetops; the moderately well drained Hollywood, Providence, and Tippah and well drained Ruston soils on ridgetops and the upper side slopes; and the moderately well drained Sacul soils on side slopes.

Most areas of this map unit are used as woodland. A small acreage is used for pasture or crops or is developed for homesites.

The soils in this map unit generally are well suited to woodland, but the Bayoudan soils are only moderately well suited. The potential production of loblolly pine is high. Logging during winter and early spring can be limited by wetness. Erosion is a severe hazard in areas of the Bayoudan soils. Plant competition and the risk of compaction are additional management concerns. All three soils are well suited to habitat for woodland wildlife.

The soils in this map unit generally are moderately well suited to cultivated crops and well suited to pasture. The Bayoudan soils, however, are poorly suited or unsuited to cultivated crops and moderately well suited or poorly suited to pasture because of the hazard of erosion. The main limitations are wetness in the nearly level soils and a severe erosion hazard on the more sloping soils. Low or medium fertility is a minor limitation.

The soils in this map unit are poorly suited to most urban uses. The main limitations are the wetness, slow or very slow permeability, the slope, and a high or very high shrink-swell potential. Low strength is a limitation on sites for local roads and streets.

10. Libuse-Gore-Vick

Nearly level to moderately steep, moderately well drained and somewhat poorly drained soils that have a loamy surface layer and a loamy, a clayey, or a loamy and clayey subsoil

This map unit consists of soils on broad ridgetops and side slopes in the uplands. The landscape is crossed by numerous deeply incised streams. Slopes range from 0 to 15 percent.

This map unit makes up about 5 percent of the parish. It is about 45 percent Libuse soils, 32 percent Gore soils, 11 percent Vick soils, and 12 percent soils of minor extent.

The moderately well drained, gently sloping Libuse soils are on broad ridgetops and on side slopes. They have a surface layer of dark grayish brown silt loam and a subsurface layer of brown silt loam. The upper part of the subsoil is strong brown, mottled silty clay loam. The next part is yellowish brown, mottled silt loam. The lower part is a fragipan of yellowish brown and light brownish gray, mottled silt loam.

The moderately well drained, moderately sloping to moderately steep Gore soils are on side slopes. They have a surface layer of dark grayish brown silt loam and a subsurface layer of brown silt loam. The upper part of the subsoil is red and grayish brown, mottled clay. The lower part is yellowish red, mottled silty clay and clay.

The somewhat poorly drained, nearly level Vick soils are on broad, slightly convex ridgetops. They have a surface layer of brown silt loam. The next layer is yellowish brown, mottled silt loam. In sequence downward, the subsoil is yellowish brown, mottled silt loam and light gray silt; mottled yellowish brown and grayish brown silty clay; mottled light yellowish brown, olive yellow, and light brownish gray silty clay loam; and light brownish gray, light yellowish brown, and olive yellow, mottled silt loam and silty clay loam.

Of minor extent are the poorly drained Guyton soils in drainageways and on flats, the well drained Kisatchie soils on the lower slopes, and the moderately well drained Tippah soils on convex, narrow ridgetops.

Most areas of this map unit are used as woodland or pasture. A small acreage is used for cultivated crops or is developed for homesites.

The soils in this map unit are well suited to woodland. The potential production of loblolly pine and hardwoods is high. Logging during winter and early spring can be limited by wetness. Other management concerns are the risk of compaction and plant competition. These soils are well suited to habitat for woodland wildlife.

The soils in this map unit generally are moderately well suited to cultivated crops and well suited to pasture. The Gore soils on side slopes, however, are poorly suited to crops and pasture because of a severe hazard of erosion. Wetness is a limitation in the nearly level soils, and erosion is a hazard on the soils on side slopes. Low or medium fertility and a potentially toxic level of aluminum in the root zone are additional management concerns.

The Libuse soils are moderately well suited to most urban uses, but the Gore and Vick soils are poorly suited. The main limitations are the wetness, slow or very slow permeability, the slope, and a high shrink-swell potential. Low strength is a limitation on sites for local roads and streets.

11. Smithdale-Ruston-Providence

Very gently sloping to steep, well drained and moderately well drained soils that are loamy throughout

This map unit consists of soils on ridgetops and side slopes in the uplands. It is drained by many deeply incised streams. Slopes range from 1 to 30 percent.

This map unit makes up about 14 percent of the parish. It is about 53 percent Smithdale soils, 25 percent Ruston soils, 12 percent Providence soils, and 10 percent soils of minor extent.

The well drained, moderately steep and steep Smithdale soils are on side slopes. They have a surface

layer of dark grayish brown fine sandy loam. The subsurface layer is brown fine sandy loam. The upper part of the subsoil is red sandy clay loam. The lower part is red and yellowish red sandy loam.

The well drained, gently sloping and moderately sloping Ruston soils are on ridgetops and side slopes. They have a surface layer of very dark grayish brown fine sandy loam. The subsurface layer is brown fine sandy loam. The subsoil is mainly red sandy clay loam and fine sandy loam.

The moderately well drained, very gently sloping to moderately sloping Providence soils are on ridgetops and side slopes. They have a surface layer of very dark grayish brown silt loam. The next layer is dark brown silt loam. The upper part of the subsoil is yellowish red silty clay loam and strong brown silt loam. The lower part is a fragipan of strong brown and dark brown, mottled silt loam, loam, and sandy loam.

Of minor extent are the poorly drained Guyton soils in narrow drainageways; the well drained Kisatchie and moderately well drained Oula soils on the lower side slopes; and the moderately well drained Kurth, Malbis, Tippah, and Savannah and well drained Lexington soils on ridgetops.

Most areas of this map unit are used as woodland. Many small areas are used as pasture or are developed for homesites.

The Smithdale soils are moderately well suited to woodland, and the Ruston and Providence soils are well suited. The potential production of loblolly pine is high or very high. The main limitations affecting commercial timber production are the moderately steep and steep slopes and deeply incised drainageways, which can limit the use of harvesting and planting equipment. Erosion is a severe hazard in the steeper areas. Plant competition and the risk of compaction are additional management concerns in areas of the Providence soils. All three soils are well suited to habitat for woodland wildlife.

The Smithdale soils generally are not suited to cultivated crops and are poorly suited to pasture. The complex slopes and a severe hazard of erosion are the main management concerns. The Ruston and Providence soils are moderately well suited to crops and are well suited to pasture. The hazard of erosion, low or medium fertility, and a potentially toxic level of aluminum in the root zone are the main management concerns.

The Smithdale soils are poorly suited to urban uses because of the slope. The Ruston and Providence soils generally are moderately well suited to these uses. The main limitations are the slope, the wetness, and moderate or moderately slow permeability. Low strength is a limitation on sites for local roads and streets.

12. Oula-Kisatchie-Providence

Very gently sloping to steep, moderately well drained and well drained soils that have a loamy surface layer and a clayey, a loamy and clayey, or a loamy subsoil

This map unit consists of soils on ridgetops and side slopes in the uplands. The landscape is one of narrow and convex ridgetops, complex side slopes, and deeply incised streams. In places sandstone and siltstone crop out. Slopes range from 1 to 40 percent.

This map unit makes up about 6.2 percent of the parish. It is about 26 percent Oula soils, 21 percent Kisatchie soils, 19 percent Providence soils, and 34 percent soils of minor extent.

The moderately well drained Oula soils are in moderately sloping to steep areas on side slopes. They have a surface layer of dark grayish brown very fine sandy loam or grayish brown fine sandy loam. The subsoil is grayish brown, mottled clay. The substratum is light brownish gray, stratified sandy clay loam and clay.

The well drained Kisatchie soils are in strongly sloping to steep areas on side slopes. They have a surface layer of very dark grayish brown fine sandy loam. The subsoil is grayish brown, mottled clay loam and silty clay. Below this is olive gray, weathered, fractured sandstone.

The moderately well drained Providence soils are in very gently sloping to moderately sloping areas on ridgetops and side slopes. They have a surface layer of very dark grayish brown and dark brown silt loam. The upper part of the subsoil is yellowish red silty clay loam and strong brown silt loam. The lower part is a fragipan of dark brown and strong brown, mottled silt loam, loam, and sandy loam.

Of minor extent are the poorly drained Guyton soils on narrow flood plains, the moderately well drained Kurth and Tippah and well drained Lexington and Ruston soils on ridgetops, and the well drained Smithdale soils on side slopes.

Most areas of this map unit are used as woodland. A small acreage is used as pasture or is developed for homesites.

The Oula soils are moderately well suited to woodland, the Kisatchie soils are poorly suited, and the Providence soils are well suited. The potential of the Oula soils for the production of loblolly pine is moderate, the potential of the Kisatchie soils is low, and the potential of the Providence soils is high. The steep, complex slopes, a limited rooting depth, the rock outcrop, and the deeply incised drainageways limit the use of equipment. The hazard of erosion is severe in areas of the Oula and Kisatchie soils. Plant competition and the risk of compaction are additional management

concerns. All three soils are moderately well suited to habitat for woodland wildlife.

The Oula and Kisatchie soils are generally not suited to cultivated crops and are poorly suited to pasture because of moderately steep and steep slopes and a severe hazard of erosion. The rock outcrop also is a limitation. The Providence soils generally are moderately well suited to crops and pasture. They are limited mainly by a moderate or severe hazard of erosion, medium fertility, and a potentially toxic level of aluminum in the root zone.

The Oula and Kisatchie soils are poorly suited to urban uses, and the Providence soils are moderately well suited. The main management concerns are moderately slow or very slow permeability, a high shrink-swell potential, the depth to bedrock, low strength on sites for local roads and streets, the slope, and the hazard of erosion. Wetness is an additional limitation in areas of the Providence soils.

13. Keithville-Sacul-Malbis

Gently sloping to moderately steep, moderately well drained soils that have a loamy surface layer and a loamy and clayey or a loamy subsoil

This map unit consists of soils on gently sloping, convex ridgetops and on gently sloping to moderately steep side slopes in the uplands. In some areas the landscape is one of long, smooth slopes on broad ridgetops and side slopes. In other areas it is one of short, complex slopes, narrow ridgetops, and deeply incised streams. Slopes range from 1 to 20 percent.

This map unit makes up about 3.8 percent of the parish. It is about 36 percent Keithville soils, 27 percent Sacul soils, 24 percent Malbis soils, and 13 percent soils of minor extent.

The gently sloping Keithville soils are on ridgetops and side slopes. They have a surface layer of brown very fine sandy loam and a subsurface layer of light yellowish brown very fine sandy loam. In sequence downward, the subsoil is yellowish brown very fine sandy loam and strong brown, mottled silty clay loam; yellowish brown silty clay loam; mottled yellowish brown, light brownish gray, and red silty clay loam, silt, and very fine sand; and grayish brown and mottled light brownish gray and yellowish brown sandy clay.

The gently sloping to moderately steep Sacul soils are on convex ridgetops and side slopes. They have a surface layer of very dark grayish brown and dark grayish brown fine sandy loam. The upper part of the subsoil is yellowish red, mottled clay. The lower part is mottled yellowish brown and light brownish gray clay loam. The substratum is stratified light brownish gray sandy clay loam and yellowish brown sandy loam.

The gently sloping Malbis soils are on ridgetops and side slopes. They have a surface layer of very dark grayish brown fine sandy loam and a subsurface layer of brown fine sandy loam. The upper part of the subsoil is yellowish brown loam. The lower part is yellowish brown and light brownish gray, mottled sandy clay loam and clay loam.

Of minor extent are the moderately well drained Bayoudan soils on the lower side slopes; the poorly drained Guyton soils in narrow drainageways; and the well drained Ruston, somewhat poorly drained Pheba, and moderately well drained Savannah and Shatta soils on ridgetops.

Most areas of this map unit are used as woodland. Many small areas are used as pasture or are developed for homesites.

The soils in this map unit are well suited to woodland. The potential production of loblolly pine is high. Logging during winter and early spring can be limited by wetness. Plant competition and the risk of compaction are additional management concerns. These soils are well suited to habitat for woodland wildlife.

The Keithville and Malbis soils are moderately well suited to cultivated crops and well suited to pasture. The main management concerns are the hazard of erosion, low fertility, and a potentially toxic level of aluminum in the root zone. The Sacul soils are poorly suited or generally unsuited to crops and are only moderately well suited to pasture because of a severe hazard of erosion.

The Keithville and Malbis soils are moderately well suited to urban uses. The main limitations are the wetness, moderately slow or very slow permeability, low strength on sites for local roads and streets, and a high shrink-swell potential. The Sacul soils are poorly suited to most urban uses because of the slope, slow permeability, a high shrink-swell potential, the wetness, and low strength, which is a limitation on sites for local roads and streets.

14. Providence

Very gently sloping and moderately sloping, moderately well drained soils that are loamy throughout

This map unit consists of very gently sloping soils on convex ridgetops and moderately sloping soils on side slopes in the uplands. The landscape is mainly one of narrow to broad ridgetops and short side slopes. Slopes range from 1 to 8 percent.

This map unit makes up about 1 percent of the parish. It is about 90 percent Providence soils and 10 percent soils of minor extent.

The Providence soils have a surface layer of very

dark grayish brown and dark brown silt loam. The upper part of the subsoil is yellowish red silty clay loam and strong brown silt loam. The lower part is a fragipan of dark brown and strong brown, mottled silt loam, loam, and sandy loam.

Of minor extent are the well drained Kisatchie and Smithdale and moderately well drained Oula soils on side slopes, the well drained Lexington and moderately well drained Kurth and Tippah soils on ridgetops, and the poorly drained Guyton soils in drainageways.

Most areas of this map unit are used as woodland or pasture. A small acreage is used as cropland or is developed for homesites.

The soils in this map unit are well suited to woodland. The potential production of loblolly pine and shortleaf pine is high. The main management concerns are a moderate equipment limitation, which is caused by wetness; moderate competition from undesirable understory plants; and the risk of compaction, which can reduce the productivity of the soils. These soils are well suited to habitat for woodland wildlife.

The soils in this map unit are moderately well suited to cultivated crops and well suited to pasture. The hazard of erosion is moderate or severe. Medium fertility and a potentially toxic level of aluminum in the root zone are additional management concerns.

The soils in this map unit are moderately well suited to urban uses. The main limitations are wetness, moderately slow permeability, and the slope. Low strength is a limitation on sites for local roads and streets.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series.* Except for differences in texture of the surface layer or of the substratum, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the substratum. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases.* Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Bayoudan silt loam, 1 to 5 percent slopes, is a phase of the Bayoudan series.

Some map units are made up of two or more major soils. These map units are called soil complexes or undifferentiated groups.

A *soil complex* consists of two or more soils, or one or more soils and a miscellaneous area, in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Kisatchie-Oula complex, 8 to 40 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils in the mapped areas are not uniform. An area can be made up of only one of the major soils, or it can be made up of all of them. Guyton and Ouachita soils, frequently flooded, is an undifferentiated group in this survey area.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description.

This survey includes *miscellaneous areas.* Such areas have little or no soil material and support little or no vegetation. Pits, gravel, is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

The descriptions, names and delineations of the soils on the detailed soil maps of this parish do not fully agree with those on the maps of Avoyelles, Catahoula, Grant, and Rapides Parishes. Differences result from a better knowledge of soils, modifications of series concepts, and variations in the intensity of mapping or in the extent of the soils in the parishes.

Nearly all of the soils in La Salle Parish were mapped at the same level of detail, except for those on narrow stream bottoms. Flooding so limits use and management that it is of little importance to separate all of the soils on these stream bottoms in mapping.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

Soil Descriptions

Ag—Alligator clay, occasionally flooded. This level, poorly drained soil is on broad flats on flood plains. Individual areas range from about 25 to 800 acres in size. Slopes are less than 1 percent.

Typically, the surface layer is dark grayish brown,

mottled clay about 5 inches thick. The subsoil to a depth of about 60 inches is gray, mottled clay. In places it is medium acid to neutral.

Included with this soil in mapping are a few small areas of Dundee, Fausse, Sharkey, and Tensas soils. Also included are small areas of Alligator soils that are gently undulating and small areas of Alligator soils that are frequently flooded or rarely flooded. Dundee soils are higher on the landscape than the Alligator soil. They are loamy throughout. Fausse soils are in the lower landscape positions and remain wet throughout the year. They do not dry and crack to so great a depth as the Alligator soil. Sharkey soils are in landscape positions similar to those of the Alligator soil. They are more alkaline in the subsoil than the Alligator soil. Tensas soils are slightly higher on the landscape than the Alligator soil. They are loamy in the lower part of the subsoil. Included soils make up about 10 percent of the map unit.

The Alligator soil has a medium level of fertility and a moderately high level of aluminum in the root zone. The aluminum is potentially toxic to some crops. Water and air move through this soil at a very slow rate. Water runs off the surface at a slow rate and stands in low areas for long periods after heavy rains. A seasonal high water table is at a depth of about 0.5 foot to 2.0 feet during the period January through April. The soil is flooded for brief to very long periods, mainly in late winter, in spring, and in early summer. The flooding occurs less often than 5 years out of 10 during the cropping season and on a yearly basis. Typically, the floodwater is 2 to 5 feet deep and in places is more than 10 feet deep. The duration of the flooding may exceed 1 month. The surface layer is very sticky when wet and dries slowly once it has become wet. The shrink-swell potential is very high. An adequate amount of water is available to plants in most years.

Most of the acreage of this soil is used for cultivated crops, mainly rice, soybeans, grain sorghum, and wheat. A small acreage is used as woodland or pasture or is developed for homesites.

This soil is poorly suited to most cultivated crops. The main management concerns are the flooding, the wetness, and poor tilth. The medium fertility and the potentially toxic level of exchangeable aluminum in the root zone are additional limitations. The flooding delays planting and damages crops in some years (fig. 2). The soil cannot be easily kept in good tilth and can be worked only within a narrow range in moisture content. It becomes cloddy if it is tilled when too wet or too dry. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Minimizing tillage and returning all crop residue to the soil or regularly adding other organic material improve fertility and help to maintain tilth and the content of organic matter. Flooding can be controlled by levees, channels, and water pumps.

This soil is moderately well suited to woodland. It has a high potential for the production of hardwoods, such as water oak, Nuttall oak, sugarberry, green ash, and honeylocust. The main concerns in producing and harvesting timber are the flooding, the wetness, and the clayey surface layer. The wetness and the flooding severely limit the use of equipment during winter and spring and result in a moderately high seedling rate. Using special equipment during wet periods helps to prevent compaction and the formation of ruts. Logging during the drier periods also can minimize compaction. After the trees are harvested, carefully managed reforestation helps to control competition from undesirable understory plants. Only the trees that can tolerate seasonal wetness should be selected for planting. Eastern cottonwood, American sycamore, and green ash are suitable for planting.

This soil is poorly suited to pasture. The chief suitable pasture plant is common bermudagrass. The main management concerns are the wetness and the flooding. Flooding can be controlled by levees and water pumps. Excess surface water can be removed by shallow ditches. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition. Applications of lime and fertilizer improve fertility and increase forage production.

This soil is well suited to habitat for wetland wildlife and moderately well suited to habitat for woodland wildlife. The habitat for wetland wildlife can be improved by constructing shallow ponds, which provide open water areas for waterfowl and furbearers, such as muskrat, nutria, and otter. The habitat for woodland wildlife, such as white-tailed deer, squirrels, and many species of nongame birds and animals, can be improved by planting oak trees and suitable understory plants.

This soil is poorly suited to urban uses. It is not suitable as a site for dwellings. It has severe limitations if used as a site for buildings, local roads and streets, or most kinds of sanitary facilities. The main limitations are the wetness, low strength on sites for roads and streets, the very slow permeability, the very high shrink-swell potential, and the hazard of flooding. Ring levees, pumps, and other water-control measures are needed to control flooding and remove excess water. Roads and streets can be built above the expected level of flooding. Because of excess water, shallow ditches and a proper grade are needed. Septic tank absorption fields do not function properly during rainy periods because of the wetness and the very slow permeability. Lagoons or self-contained disposal units can be used to

Figure 2.—A wheat field damaged by floodwater in an area of Alligator clay, occasionally flooded.

dispose of sewage properly. The adverse effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has a low shrink-swell potential.

The capability subclass is IVw. The woodland ordination symbol is 8W.

At—Alligator clay, frequently flooded. This level, poorly drained soil is in low positions on alluvial plains. Individual areas range from about 25 to 900 acres in size. Slopes are less than 1 percent.

Typically, the surface layer is dark grayish brown, mottled clay about 4 inches thick. The subsoil to a depth of about 54 inches is gray, mottled clay. The substratum to a depth of about 60 inches also is gray, mottled clay. In a few small areas, the subsoil is medium acid to neutral below a depth of 20 inches.

Included with this soil in mapping are a few small areas of Fausse, Sharkey, and Tensas soils. Also included are small areas of Alligator soils that are gently undulating; small areas of Alligator soils that are not frequently flooded; and, along the shores of Catahoula Lake, long, narrow areas of Alligator soils that are covered by sandy overwash. The areas of overwash are identified on the soil maps by a special symbol. The very poorly drained Fausse soils are in depressions and do not crack to a depth of 20 inches. Sharkey soils are in landscape positions similar to those of the Alligator soil. They are more alkaline in the subsoil than the Alligator soil. Tensas soils are slightly higher on the landscape than the Alligator soil. They are loamy in the lower part of the subsoil. Included soils make up about 10 percent of the map unit.

The Alligator soil has a medium level of fertility and a moderately high level of exchangeable aluminum in the root zone. The aluminum is potentially toxic to some crops. Water and air move through this soil at a very slow rate. Water runs off the surface at a slow rate and stands in low areas for long periods after heavy rains. A seasonal high water table is at a depth of about 0.5 foot to 2.0 feet during the period January through April. The soil is flooded for brief to very long periods, mainly in

late winter, in spring, and in early summer. The flooding occurs more often than 5 years out of 10 during the cropping season and on a yearly basis. Typically, the floodwater is 5 to 10 feet deep and in places is more than 12 feet deep. The duration of the flooding may exceed 2 months. Low areas are ponded after each rain. The shrink-swell potential is very high. An adequate amount of water is available to plants in most years.

Most areas of this soil are used for short-season crops or are wooded. A few areas are used for grazing or as habitat for wildlife.

This soil is poorly suited to most cultivated crops. The chief suitable crops are soybeans and grain sorghum. The main management concerns are the flooding, the wetness, the medium fertility, and the potentially toxic level of aluminum in the root zone. The flooding delays planting and damages crops in some years. The soil cannot be easily kept in good tilth and can be worked only within a narrow range in moisture content. It becomes cloddy if it is tilled when too wet or too dry. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Minimizing tillage and returning all crop residue to the soil or regularly adding other organic material improve fertility and help to maintain tilth and the content of organic matter. Flooding can be controlled by levees, channels, and water pumps.

This soil is poorly suited to the production of southern hardwoods. It has a high potential for the production of hardwoods, but management is difficult because of the wetness and the frequent flooding. The most common trees are overcup oak, water hickory, green ash, water locust, Nuttall oak, and baldcypress. Using special harvesting equipment during wet periods or logging only during the drier periods helps to prevent compaction and the formation of ruts. After the trees are harvested, carefully managed reforestation helps to control competition from undesirable understory plants. Only the trees that can tolerate seasonal wetness should be selected for planting. Eastern cottonwood and baldcypress are suitable for planting.

This soil is well suited to habitat for wetland wildlife and moderately well suited to habitat for woodland wildlife. The habitat for wetland wildlife can be improved by constructing shallow ponds, which provide open water areas for waterfowl and furbearers, such as muskrat, nutria, and otter. The habitat for woodland wildlife, such as white-tailed deer and squirrels, can be improved by planting oak trees and suitable understory plants.

This soil is poorly suited to pasture. The chief suitable pasture plant is common bermudagrass. The main management concerns are the wetness and the flooding. The wetness limits the choice of plants that can be grown and the period of grazing. Grazing when the soil is wet results in puddling of the surface layer and damage to the plant community. During periods of flooding, cattle can be moved to protected areas or to pastures at the higher elevations. Heavy applications of fertilizer or lime generally are not practical because of the frequent flooding.

This soil is poorly suited to urban uses. It is not suitable as a site for dwellings. It has severe limitations if used as a site for buildings, local roads and streets, or most kinds of sanitary facilities. The main limitations are the wetness and the flooding. Other limitations are the very slow permeability, a very high shrink-swell potential, and low strength, which affects roads and streets. Ring levees, pumps, and other water-control measures are needed to control flooding and remove excess water. Roads and streets can be built above the expected level of flooding.

The capability subclass is Vw. The woodland ordination symbol is 7W.

Bb—Bayoudan silt loam, 1 to 5 percent slopes. This gently sloping, moderately well drained soil is on ridgetops and the upper side slopes in the uplands. Individual areas are irregular in shape and range from 15 to 200 acres in size. Slopes are generally long and smooth, but some are short and complex.

Typically, the surface layer is dark grayish brown silt loam about 3 inches thick. The subsoil to a depth of about 75 inches is mottled clay. It is yellowish red in the upper part; grayish brown in the next part; and grayish brown, strong brown, and red in the lower part. In some areas the surface layer is silty clay loam, clay, or fine sandy loam.

Included with this soil in mapping are a few small areas of Falkner, Guyton, and Tippah soils. Also included are small areas of Bayoudan soils that have slopes of more than 5 percent. Falkner and Tippah soils are at the slightly higher elevations. They are loamy in the upper part of the subsoil. The poorly drained Guyton soils are in drainageways. They are grayish and loamy throughout. Included soils make up about 15 percent of the map unit.

The Bayoudan soil has a low level of fertility and a high level of exchangeable aluminum in the root zone. The aluminum is potentially toxic to most crops. Water and air move through this soil at a very slow rate. Runoff is medium, and the hazard of water erosion is moderate. The plow layer is friable, but it is somewhat difficult to keep in good tilth where it has been mixed with some of the clayey subsoil by cultivation. The shrink-swell potential is very high in the subsoil.

Most of the acreage of this soil is used as woodland.

A small acreage is used as pasture or cropland or is developed for homesites.

This soil is moderately well suited to woodland. It has a moderately high potential for the production of loblolly pine and shortleaf pine. The main concerns in producing and harvesting timber are trafficability and the hazard of erosion. Because the clayey subsoil is sticky when wet, most planting and harvesting equipment can be used only during dry periods. The surface can become severely compacted if the trees are planted or harvested when the soil is wet. Logging roads and landings can be protected against erosion by constructing diversions and by seeding cuts and fills. After the trees are harvested, carefully managed reforestation helps to control competition from undesirable understory plants. Proper site preparation and spraying, cutting, or girdling can eliminate unwanted weeds, brush, and trees.

This soil is moderately well suited to pasture. The chief suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, ryegrass, and crimson clover. The main management concerns are the low fertility and the hazard of erosion. A seedbed should be prepared on the contour or across the slope where practical. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition. Applications of lime and fertilizer improve fertility and increase forage production.

This soil is well suited to habitat for woodland wildlife. The habitat can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. If rotated among several small tracts of land, prescribed burning every 3 years can increase the supply of palatable deer browse and the supply of seed-producing plants for use by quail and turkey.

This soil is poorly suited to cultivated crops. The main management concerns are the low fertility, the high level of exchangeable aluminum, and the moderate hazard of erosion. Measures that control erosion include early fall seeding, minimum tillage, terraces, diversions, and grassed waterways. The soil should be tilled on the contour or across the slope. Maintaining crop residue on or near the surface helps to control runoff and maintain tilth and the organic matter content. Most crops respond well to systematically applied fertilizer and lime, which help to overcome the low fertility and the potentially toxic level of exchangeable aluminum.

This soil is poorly suited to urban uses. It has severe limitations if used as a site for buildings, local roads and streets, or most kinds of sanitary facilities. The main limitations are the very slow permeability, the slope, low strength on sites for roads and streets, and the very high shrink-swell potential. Where excavations are made, cutbanks cave in easily. Properly designing foundations and footings and diverting runoff away from buildings help to prevent the structural damage caused by shrinking and swelling. Septic tank absorption fields do not function properly during rainy periods because of the very slow permeability. Lagoons or self-contained disposal units can be used to dispose of sewage properly. Preserving the existing plant cover during construction helps to control erosion. Applying fertilizer, seeding, mulching, and shaping the slopes help to establish and maintain a good plant cover.

The capability subclass is IVe. The woodland ordination symbol is 8C.

Bc—Bayoudan silty clay loam, 5 to 15 percent slopes. This moderately sloping to moderately steep, moderately well drained soil is on side slopes in the uplands. Many well defined drainageways cross most areas. Individual areas are irregular in shape and range from 15 to 300 acres in size. Slopes are generally short and complex.

Typically, the surface layer is dark brown silty clay loam about 5 inches thick. The subsoil to a depth of about 60 inches is clay. It is red in the upper part; mottled red, light olive gray, and pale olive in the next part; and light olive gray in the lower part. In places the surface layer is clay, silty clay loam, or fine sandy loam.

Included with this soil in mapping are a few small areas of Falkner, Guyton, and Tippah soils. Also included are small areas of Bayoudan soils that have slopes of less than 5 percent or more than 15 percent. Falkner and Tippah soils are at the slightly higher elevations. They are loamy in the upper part of the subsoil. The poorly drained Guyton soils are in drainageways. They are grayish and loamy throughout. Included soils make up about 15 percent of the map unit.

The Bayoudan soil has a low level of fertility and a high level of exchangeable aluminum in the root zone. The aluminum is potentially toxic to most crops. Water and air move through this soil at a very slow rate. Runoff is rapid, and the hazard of water erosion is severe. The surface layer is friable, but it is somewhat difficult to keep in good tilth where it has been mixed with some of the clayey subsoil by cultivation. The shrink-swell potential is very high in the subsoil.

Most areas of this soil are used as woodland. A small acreage is used as pasture or cropland or is developed for homesites.

This soil is moderately well suited to woodland. It has a moderately high potential for the production of loblolly pine and shortleaf pine. The main concerns in

producing and harvesting timber are trafficability and the hazard of erosion. Conventional methods of harvesting trees generally are suitable, but the surface can become compacted if heavy equipment is used when the soil is wet. Harvesting during dry periods and properly locating skid trails, log landings, and haul roads on limited grades help to control erosion. Logging roads and landings can be protected against erosion by constructing diversions and by seeding cuts and fills.

This soil is well suited to habitat for woodland wildlife. The habitat can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. If rotated among several small tracts of land, prescribed burning every 3 years can increase the supply of palatable deer browse and the supply of seed-producing plants for use by quail and turkey.

This soil is poorly suited to pasture. The chief suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, ryegrass, crimson clover, and ball clover. The main management concerns are the low fertility and the severe hazard of erosion. A seedbed should be prepared on the contour or across the slope where practical. Applications of lime and fertilizer improve fertility and increase forage production. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition.

This soil is poorly suited to cultivated crops. The main management concerns are the slope, the low fertility, the potentially toxic level of exchangeable aluminum, and the severe hazard of erosion. Measures that control erosion include early fall seeding, minimum tillage, terraces, diversions, and grassed waterways. The soil should be tilled on the contour or across the slope. Most crops respond well to systematically applied fertilizer and lime, which help to overcome the low fertility and the potentially toxic level of exchangeable aluminum in the root zone.

This soil is poorly suited to urban uses. It has severe limitations if used as a site for buildings, local roads and streets, or most kinds of sanitary facilities. The main limitations are the slope, the very high shrink-swell potential, low strength on sites for roads and streets, and the very slow permeability. Where excavations are made, cutbanks cave in easily. Slippage on side slopes can damage roads and streets. Properly designing foundations and footings and diverting runoff away from buildings help to prevent the structural damage caused by shrinking and swelling. Septic tank absorption fields do not function properly during rainy periods because of the very slow permeability. Lagoons or self-contained disposal units can be used to dispose of sewage properly. Preserving the existing plant cover during construction helps to control erosion. Applying fertilizer, seeding, mulching, and shaping the slopes help to establish and maintain a good plant cover.

The capability subclass is VIe. The woodland ordination symbol is 8C.

Bd—Bayoudan clay, 15 to 40 percent slopes. This steep, moderately well drained soil is on side slopes in the uplands. It is unstable when wet, and landslides are common. Well defined drainageways cross most areas. Individual areas are irregular in shape and range from 20 to 250 acres in size. Slopes are generally short and complex. Sharp, nearly vertical escarpments are common.

Typically, the surface layer is very dark grayish brown clay about 3 inches thick. The part of the subsoil within a depth of about 34 inches is mottled clay. It is red in the upper part, yellowish brown in the next part, and light olive brown in the lower part. The part of the subsoil between depths of 34 inches and 68 inches is stratified grayish brown and yellowish brown clay. It has a few accumulations of gypsum salts. In places the lower part of the subsoil is calcareous, yellowish brown clay.

Included with this soil in mapping are a few small areas of Providence, Ruston, and Tippah soils. Also included are small areas of Bayoudan soils that have slopes of less than 15 percent. Providence and Ruston soils are on narrow ridgetops and the upper side slopes. They are loamy throughout. Tippah soils are on ridgetops and the upper side slopes. They are loamy in the upper part of the subsoil. Included soils make up about 15 percent of the map unit.

The Bayoudan soil has a low level of fertility and a high level of exchangeable aluminum in the root zone. The aluminum is potentially toxic to most crops. Water and air move through this soil at a very slow rate. Runoff is rapid, and the hazard of water erosion is severe. The surface layer is very sticky when wet and very hard when dry. The shrink-swell potential is very high.

Most areas of this soil are used as woodland. A small acreage is used as pasture.

This soil is moderately well suited to loblolly pine and shortleaf pine. The main concerns in producing and harvesting timber are the slope, trafficability, and the hazard of erosion. Conventional methods of harvesting trees can be used in the more gently sloping areas but cannot be easily used in the steeper areas. Because the clayey soil is sticky when wet, most planting and harvesting equipment can be used only during dry periods. Management that minimizes the risk of erosion is essential in harvesting timber. Harvesting during dry periods and properly locating skid trails, log landings,

and haul roads on limited grades help to control erosion and prevent compaction and the formation of ruts. Logging roads and landings can be protected against erosion by constructing diversions and by seeding cuts and fills. After the trees are harvested, carefully managed reforestation helps to control competition from undesirable understory plants. Proper site preparation and spraying, cutting, or girdling can eliminate unwanted weeds, brush, and trees.

This soil is moderately well suited to habitat for woodland wildlife. The habitat can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. If rotated among several small tracts of land, prescribed burning every 3 years can increase the supply of palatable deer browse and the supply of seed-producing plants for use by quail and turkey.

This soil is poorly suited to pasture. The chief suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, and crimson clover. The main limitations are the slope, the clayey surface layer, the low fertility, and the severe hazard of erosion. The steep areas where seedbed preparation is difficult are best suited to native grasses. Applications of lime and fertilizer improve fertility and increase forage production. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition.

This soil is not suited to cultivated crops, mainly because the slopes are too steep and the hazard of erosion is too severe. The irregular slopes, the clayey surface layer, the low fertility, and the potentially toxic level of exchangeable aluminum are additional limitations.

This soil is poorly suited to most urban uses. It generally is not suitable as a site for buildings because of the slope and the hazard of slippage. Other limitations are the very slow permeability, the clayey texture, the very high shrink-swell potential, and low strength, which affects local roads and streets.

The capability subclass is VIIe. The woodland ordination symbol is 8C.

Be—Bienville loamy fine sand, 1 to 3 percent slopes. This very gently sloping, somewhat excessively drained, sandy soil is on low stream terraces. It is subject to rare flooding. Individual areas are irregular in shape and range from 5 to 50 acres in size.

Typically, the surface layer is dark brown loamy fine sand about 9 inches thick. The subsurface layer is yellowish brown loamy fine sand about 8 inches thick. The subsoil to a depth of about 64 inches is strong brown and brown loamy fine sand. In some areas the surface layer is fine sandy loam.

Included with this soil in mapping are a few small areas of Cahaba and Guyton soils. Also included are small areas of Bienville soils that are occasionally flooded. Cahaba soils are on the slightly higher ridges. They have more clay in the subsoil than the Bienville soil. The poorly drained Guyton soils are in drainageways and concave areas or on flats. They are loamy and grayish throughout. Included soils make up about 15 percent of the map unit.

The Bienville soil has a low level of fertility and a moderately high level of exchangeable aluminum in the root zone. The aluminum is potentially toxic to crops. Water and air move through this soil at a moderately rapid rate. Runoff is slow. A seasonal high water table is at a depth of about 4 to 6 feet during the period December through April in most years. Although it is rare, flooding can occur during unusual weather conditions. The soil dries quickly after rains. The shrink-swell potential is low. Plants generally are adversely affected by a lack of water during dry periods in the summer and fall of most years.

Most areas of this soil are used as woodland. A small acreage is used as pasture or cropland or is developed for homesites.

This soil is well suited to the production of hardwoods and pine trees. The main concerns in producing and harvesting timber are the sandy surface layer and droughtiness. Trafficability is poor when this sandy soil is dry. A low available water capacity generally restricts seedling survival in areas where understory plants are numerous.

This soil is well suited to habitat for woodland wildlife. The habitat can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. If rotated among several small tracts of land, prescribed burning every 3 years can increase the supply of palatable deer browse and the supply of seed-producing plants for use by quail and turkey.

This soil is well suited to pasture. The main management concerns are the low fertility and droughtiness. The low available water capacity limits the choice of suitable pasture plants. The chief suitable plants are improved bermudagrass, common bermudagrass, weeping lovegrass, bahiagrass, and crimson clover. Applications of lime and fertilizer improve fertility and increase forage production. Proper stocking rates and pasture rotation help to keep the pasture in good condition.

This soil is moderately well suited to most cultivated crops. Corn is the main crop, but soybeans,

watermelons, and vegetable crops also are suitable. The main management concerns are the low fertility, droughtiness, a moderate hazard of erosion, and the moderately high level of exchangeable aluminum. The soil is friable and can be easily kept in good tilth. It can be worked throughout a wide range in moisture content. Minimizing tillage and returning all crop residue to the soil or regularly adding other organic material improve fertility and help to maintain tilth and the content of organic matter. The soil should be tilled on the contour or across the slope. Most crops respond well to systematically applied fertilizer and lime, which help to overcome the low fertility and the potentially toxic level of aluminum in the root zone.

This soil is poorly suited to most urban uses. It has moderate or severe limitations if used as a site for dwellings or sanitary facilities. The main limitations are the flooding, the moderately rapid permeability, the wetness, and the sandy surface layer. Constructing on pilings or mounds can elevate buildings above the expected level of flooding. During rainy periods the effluent from onsite sewage disposal systems can seep at points downslope. If the density of housing is moderate or high, community sewage systems are needed to prevent the contamination of water supplies resulting from seepage. Selection of suitable vegetation for planting is critical in areas used for lawns, shrubs, trees, and vegetable gardens. Plants that can tolerate droughtiness should be selected unless irrigation water is provided.

The capability subclass is IIs. The woodland ordination symbol is 10S.

Br—Bursley silt loam. This level, poorly drained soil is on low stream terraces at the elevation of flood plains. It is subject to rare flooding. Individual areas are broad and range from 20 to 350 acres in size. Slopes are less than 1 percent.

Typically, the surface layer is dark grayish brown silt loam about 4 inches thick. The subsurface layer is light brownish gray silt loam about 5 inches thick. The subsoil extends to a depth of about 78 inches. It is mottled grayish brown, yellowish brown, and dark yellowish brown silty clay loam in the upper part and mottled dark yellowish brown and grayish brown silty clay loam and silt loam in the lower part. Tongues of light brownish gray silt loam extend to a depth of 46 inches. In some areas the upper part of the subsoil is silty clay.

Included with this soil in mapping are a few small areas of Deerford, Foley, and Forestdale soils. Also included are small areas of Bursley soils that are occasionally flooded. Deerford soils are slightly higher on the landscape than the Bursley soil. They have a high level of sodium in the subsoil. Foley and Forestdale soils are slightly lower on the landscape than the Bursley soil. Foley soils have a high level of sodium in the subsoil. Forestdale soils are clayey in the upper part of the subsoil. Included soils make up about 15 percent of the map unit.

The Bursley soil has a low level of fertility and a moderately high level of exchangeable aluminum in the root zone. The aluminum is potentially toxic to some crops. Water and air move through this soil at a slow rate. Runoff is slow. A seasonal high water table is at a depth of about 0.5 foot to 3.0 feet during the period December through June in most years. Most flooding from stream overflow is controlled by levees; however, flooding can occur under unusual weather conditions. The soil dries slowly after heavy rains. The shrink-swell potential is moderate.

Most areas of this soil are used as woodland and as habitat for wildlife. A few areas are used for pasture or cultivated crops or are developed for homesites.

This soil is well suited to woodland. It has a high potential for the production of hardwoods, such as Nuttall oak, willow oak, swamp chestnut oak, water oak, and green ash. The main concern in producing and harvesting timber is the wetness, which limits the use of equipment. This limitation can be overcome by using special equipment during wet periods or by logging during the drier periods. Using standard wheeled and tracked equipment when the soil is moist can result in compaction and the formation of ruts. Puddling can occur when the soil is wet. Using low-pressure ground equipment minimizes soil damage and helps to maintain productivity. After the trees are harvested, carefully managed reforestation helps to control competition from undesirable understory plants. Proper site preparation and spraying, cutting, or girdling can eliminate unwanted weeds, brush, and trees. Only the trees that can tolerate seasonal wetness should be selected for planting. American sycamore, sweetgum, and water oak are suitable for planting.

This soil is well suited to habitat for woodland wildlife and moderately well suited to habitat for wetland wildlife. The habitat for woodland wildlife, such as squirrels, white-tailed deer, turkey, and many species of nongame birds and animals, can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. The habitat for wetland wildlife can be improved by constructing shallow ponds, which provide open water areas for waterfowl and furbearers, such as muskrat, nutria, and otter.

This soil is moderately well suited to pasture. The chief suitable pasture plants are common

bermudagrass, improved bermudagrass, bahiagrass, ryegrass, and white clover. The main limitations are the wetness and the low fertility. Grazing when the soil is wet results in puddling of the surface layer and damage to the plant community. Excess surface water can be removed by shallow ditches. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition. Applications of fertilizer and lime are needed for optimum forage production.

This soil is moderately well suited to most cultivated crops. The chief suitable crops are soybeans, rice, corn, cotton, and grain sorghum. The main management concerns are the wetness, the low fertility, and the potentially toxic level of exchangeable aluminum in the root zone. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. A tillage pan forms easily if the soil is tilled when wet. This pan can be broken by chiseling or subsoiling when the soil is dry. Minimizing tillage and returning all crop residue to the soil or regularly adding other organic material improve fertility and help to maintain tilth and the content of organic matter. Most crops respond well to systematically applied fertilizer and lime, which help to overcome the low fertility and the potentially toxic level of exchangeable aluminum in the root zone.

This soil is poorly suited to urban uses. It has severe limitations if used as a site for buildings, local roads and streets, or most kinds of sanitary facilities. The main limitations are the wetness, the slow permeability, the moderate shrink-swell potential, and low strength, which affects roads and streets. Flooding is a hazard. A drainage system is needed if buildings are constructed. Septic tank absorption fields do not function properly during rainy periods because of the wetness and the slow permeability. Lagoons or self-contained disposal units can be used to dispose of sewage properly. The adverse effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has a low shrink-swell potential.

The capability subclass is IIIw. The woodland ordination symbol is 6W.

Bs—Bursley silt loam, occasionally flooded. This level, poorly drained soil is on low stream terraces at the elevation of flood plains. Individual areas are broad and range from 10 to 350 acres in size. Slopes are less than 1 percent.

Typically, the surface layer is dark grayish brown silt loam about 3 inches thick. The subsurface layer is grayish brown silt loam about 3 inches thick. The subsoil extends to a depth of about 65 inches. In sequence downward, it is grayish brown, mottled silt loam; mottled yellowish brown, grayish brown, and dark yellowish brown silty clay loam; mottled yellowish brown, grayish brown, and dark yellowish brown clay loam; and mottled dark brown and yellowish brown loam. In places the upper part of the subsoil is silty clay.

Included with this soil in mapping are a few small areas of Deerford, Foley, and Forestdale soils. Also included, in the slightly higher positions, are small areas of Bursley soils that are only rarely flooded. Deerford soils are on the slightly higher, more convex slopes. They have a high level of sodium in the subsoil. Foley and Forestdale soils are slightly lower on the landscape than the Bursley soil. Foley soils have a high level of sodium in the subsoil. Forestdale soils are clayey in the upper part of the subsoil. Included soils make up about 15 percent of the map unit.

The Bursley soil has a low level of fertility and a moderately high level of exchangeable aluminum in the root zone. The aluminum is potentially toxic to some crops. Water and air move through this soil at a slow rate. Runoff is slow. A seasonal high water table is at a depth of about 0.5 foot to 3.0 feet during the period December through June in most years. The soil is flooded for long or very long periods in winter, in spring, and in early summer. The flooding occurs about 3 times in 10 years during the cropping season. It may occur as often as 5 times in 10 years during winter and spring. Typically, the floodwater is 2 to 5 feet deep and in places is more than 8 feet deep. The duration of the flooding may exceed 2 months. The soil dries slowly after heavy rains. The shrink-swell potential is moderate.

Most areas of this soil are used as woodland and as habitat for woodland wildlife. A few areas are used for pasture or cultivated crops.

This soil is moderately well suited to woodland. It has a high potential for the production of hardwoods, such as Nuttall oak, willow oak, swamp chestnut oak, and green ash. The wetness and the flooding limit the use of equipment during winter and spring and reduce the seedling survival rate. The equipment limitation can be overcome by using special equipment during wet periods or by logging during the drier periods. Using low-pressure ground equipment helps to prevent compaction and the formation of ruts and helps to maintain productivity. After the trees are harvested, carefully managed reforestation helps to control competition from undesirable understory plants. Proper site preparation and spraying, cutting, or girdling can eliminate unwanted weeds, brush, and trees. Only the trees that can tolerate seasonal wetness should be selected for planting. Sweetgum, American sycamore, and water oak are suitable for planting.

This soil is well suited to habitat for woodland wildlife and moderately well suited to habitat for wetland wildlife. The habitat for woodland wildlife, such as squirrels, white-tailed deer, turkey, and many species of nongame birds and animals, can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. The habitat for wetland wildlife can be improved by constructing shallow ponds, which provide open water areas for waterfowl and furbearers, such as muskrat, nutria, and otter.

This soil is poorly suited to pasture. The chief suitable pasture plants are common bermudagrass, bahiagrass, and vetch. The main management concerns are the low fertility and the hazard of flooding. Grazing when the soil is wet results in puddling of the surface layer and damage to the plant community. Excess surface water can be removed by shallow ditches. During periods of flooding, cattle can be moved to protected areas or to pastures at the higher elevations. Applications of fertilizer and lime are needed for optimum forage production.

This soil is poorly suited to most cultivated crops. The main management concerns are the flooding and the wetness. Other concerns are the low fertility and the potentially toxic level of exchangeable aluminum. Only late-planted crops, such as soybeans, can be grown. The flooding delays planting and damages crops in some years. It can be controlled by levees and water pumps.

This soil is poorly suited to most urban uses. It generally is not suitable as a site for dwellings. It has severe limitations if used as a site for buildings, local roads and streets, or most kinds of sanitary facilities. The main limitations are the flooding, the wetness, the moderate shrink-swell potential, low strength on sites for roads and streets, and the slow permeability. Ring levees, pumps, and other water-control measures are needed to control flooding and remove excess water. Constructing on pilings or mounds can elevate buildings above the expected level of flooding. Septic tank absorption fields do not function properly during rainy periods because of the wetness and the slow permeability. Roads can be built above the expected level of flooding. Properly designing the roads helps to offset the limited ability of the soil to support a load.

The capability subclass is IVw. The woodland ordination symbol is 6W.

Ch—Cahaba fine sandy loam, 1 to 3 percent slopes. This very gently sloping, well drained soil is in high positions on stream terraces. It is subject to rare flooding. Individual areas are long and narrow and range from 5 to 150 acres in size.

Typically, the surface layer is brown fine sandy loam about 8 inches thick. The subsurface layer is yellowish brown fine sandy loam about 6 inches thick. The subsoil extends to a depth of about 46 inches. It is yellowish red loam, clay loam, and sandy clay loam in the upper part and strong brown fine sandy loam in the lower part. The substratum to a depth of about 75 inches is brownish yellow and strong brown, mottled loamy sand.

Included with this soil in mapping are a few small areas of Bienville and Guyton soils. Also included are small areas of Cahaba soils that have slopes of more than 3 percent. Bienville soils are slightly lower on the landscape than the Cahaba soil. They are sandy throughout. The poorly drained Guyton soils are in drainageways and depressional areas. They are grayish throughout. Included soils make up about 15 percent of the map unit.

The Cahaba soil has a low level of fertility and a high level of exchangeable aluminum in the root zone. The aluminum is potentially toxic to most crops. Water and air move through this soil at a moderate rate. Runoff is medium. Although it is rare, flooding can occur during unusual weather conditions. The soil dries quickly after rains. The shrink-swell potential is low.

Most of the acreage of this soil is used as woodland. A small acreage is used as pasture or cropland or is developed for homesites.

This soil is well suited to woodland. It has a high potential for the production of hardwoods and pine trees. Few limitations affect the production of timber. After the trees are harvested, carefully managed reforestation helps to control competition from undesirable understory plants. If site preparation is not adequate, competition from undesirable plants can prevent or delay the natural or artificial reestablishment of trees.

This soil is well suited to habitat for woodland wildlife. The habitat can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. If rotated among several small tracts of land, prescribed burning every 3 years can increase the supply of palatable deer browse and the supply of seed-producing plants for use by quail and turkey.

This soil is well suited to pasture. The chief suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, crimson clover, ball clover, arrowleaf clover, and ryegrass. The main management concerns are the low fertility and a moderate hazard of erosion. A seedbed should be prepared on the contour or across the slope where practical. Applications of lime

and fertilizer improve fertility and increase forage production. Proper stocking rates and pasture rotation help to keep the pasture in good condition.

This soil is well suited to most cultivated crops. The chief suitable crops are corn, soybeans, and cotton. The main management concerns are the low fertility, the potentially toxic level of aluminum in the root zone, and a moderate hazard of erosion. The soil is friable and can be easily kept in good tilth. It can be worked throughout a wide range in moisture content. Minimizing tillage and returning all crop residue to the soil or regularly adding other organic material improve fertility and help to maintain tilth and the content of organic matter. The soil should be tilled on the contour or across the slope. Most crops respond well to systematically applied fertilizer and lime, which help to overcome the low fertility and the potentially toxic level of exchangeable aluminum.

This soil is poorly suited to most urban uses. The main hazard is flooding. During rainy periods, the effluent from onsite sewage disposal systems can seep at points downslope. If the density of housing is moderate or high, community sewage systems are needed to prevent the contamination of water supplies resulting from seepage.

The capability subclass is IIe. The woodland ordination symbol is 9A.

Da—Deerford silt loam. This level, somewhat poorly drained soil is on slightly convex, low ridges on low stream terraces at the elevation of flood plains. It is subject to rare flooding. Individual areas are long and narrow and range from 10 to 250 acres in size. Slopes are less than 1 percent.

Typically, the surface layer is grayish brown silt loam about 3 inches thick. The subsurface layer is grayish brown, mottled silt loam about 6 inches thick. The subsoil extends to a depth of about 65 inches. It is mottled grayish brown, yellowish brown, and brown silty clay loam and silt loam in the upper part and mottled grayish brown, yellowish brown, brown, and strong brown loam in the lower part. In a few small areas, the surface layer is very fine sandy loam or the upper part of the subsoil contains more sand.

Included with this soil in mapping are a few small areas of Bursley, Foley, and Forestdale soils. These soils are slightly lower on the landscape than the Deerford soil. Bursley and Forestdale soils do not have a high level of sodium in the subsoil. Foley soils have a subsoil that is slightly grayer than that of the Deerford soil. Included soils make up about 15 percent of the map unit.

The Deerford soil has a low level of fertility. Water and air move through this soil at a slow rate. Accumulations of sodium in the lower part of the subsoil restrict root development and limit the amount of water available to plants. Runoff is slow. Although it is rare, flooding can occur during unusual or catastrophic weather conditions. A seasonal high water table is at a depth of about 0.5 foot to 1.5 feet during the period December through April. The soil dries quickly after rains. The subsoil generally remains dry even during wet periods. The shrink-swell potential is moderate. Plants generally are adversely affected by a lack of water during dry periods in the summer and fall of most years.

Most areas of this soil are used as woodland and as habitat for wildlife. A few areas are used as pasture or cropland or are developed for homesites.

This soil is well suited to the production of hardwoods and pine trees, such as willow oak, water oak, Nuttall oak, sweetgum, and loblolly pine. Wetness can limit the use of equipment unless a drainage system is installed. This limitation can be overcome by using special equipment during wet periods or by logging during the drier periods. Using low-pressure ground equipment helps to prevent compaction and the formation of ruts and helps to maintain productivity. After the trees are harvested, carefully managed reforestation helps to control competition from undesirable understory plants. Proper site preparation and spraying, cutting, or girdling can eliminate unwanted weeds, brush, and trees. Loblolly pine and sweetgum are suitable for planting.

This soil is well suited to habitat for woodland wildlife (fig. 3) and moderately well suited to habitat for wetland wildlife. The habitat for woodland wildlife, such as squirrels, white-tailed deer, turkey, and many species of nongame birds and animals, can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. The habitat for wetland wildlife can be improved by constructing shallow ponds, which provide open water areas for waterfowl and furbearers, such as muskrat, nutria, and otter.

This soil is moderately well suited to pasture. The chief suitable pasture plants are common bermudagrass, bahiagrass, ryegrass, and white clover. The main management concerns are the low fertility, wetness during the winter and spring, and droughtiness during the summer and fall. Grazing when the soil is wet results in puddling of the surface layer and damage to the plant community. The sodium in the upper part of the subsoil limits the growth of pasture plants. Proper stocking rates, pasture rotation, and restricted grazing

Figure 3.—A hardwood forest on Deerford silt loam in the Saline Wildlife Management Area. The forest provides excellent habitat for many species of woodland wildlife.

during wet periods help to keep the pasture in good condition. Applications of fertilizer and lime are needed for optimum forage production.

This soil is moderately well suited to most cultivated crops. The chief suitable crops are soybeans, cotton, and grain sorghum. The main management concerns are wetness in spring, droughtiness in summer, the low fertility, and a high level of sodium in the subsoil. A drainage system improves the suitability for most cultivated crops and pasture plants. Deep cuts during land grading can expose the subsoil, which has a high content of sodium. Minimizing tillage and returning all crop residue to the soil or regularly adding other organic material improve fertility and help to maintain tilth and the content of organic matter. Most crops respond well to systematically applied fertilizer. Lime generally is needed.

This soil is poorly suited to urban uses. It has severe limitations if used as a site for buildings, local roads and streets, or most kinds of sanitary facilities. The main limitations are the flooding, the wetness, and the slow permeability. Other limitations are the moderate shrink-swell potential and low strength, which affects roads and streets. A drainage system is needed if buildings are constructed. Septic tank absorption fields do not function properly during rainy periods because of the wetness and the slow permeability. Lagoons or self-

contained disposal units can be used to dispose of sewage properly.

The capability subclass is IIIw. The woodland ordination symbol is 9W.

Db—Deerford silt loam, occasionally flooded. This level, somewhat poorly drained soil is on slightly convex, low ridges on low stream terraces at the elevation of flood plains. Individual areas are long and narrow and range from 10 to 250 acres in size. Slopes are less than 1 percent.

Typically, the surface layer is grayish brown silt loam about 4 inches thick. The subsurface layer is light brownish gray, mottled silt loam about 6 inches thick. The subsoil extends to a depth of about 75 inches. It is grayish brown, mottled silty clay loam in the upper part; grayish brown, mottled silty clay loam in the next part; and brown, mottled silty clay loam and clay loam in the lower part.

Included with this soil in mapping are a few small areas of Bursley, Foley, and Forestdale soils. Also included are a few small areas of soils that are similar to the Deerford soil but have a surface layer of very fine sandy loam or have more sand in the upper part of the subsoil. Bursley, Foley, and Forestdale soils are slightly lower on the landscape than the Deerford soil. Bursley and Forestdale soils do not have a high level of sodium in the subsoil. Foley soils have a subsoil that is slightly grayer than that of the Deerford soil. Included soils make up about 15 percent of the map unit.

The Deerford soil has a medium level of fertility. Concentrations of sodium in the lower part of the subsoil restrict root development and limit the amount of water available to plants. Water and air move through this soil at a slow rate. Runoff is slow. A seasonal high water table is at a depth of about 0.5 foot to 1.5 feet during the period December through April. The soil is flooded for brief to very long periods in late winter, in spring, and in early summer. The flooding occurs in about 3 years out of 10 during the cropping season and in as many as 5 years in 10 on a yearly basis. Typically, the floodwater is 1 to 3 feet deep and in places is more that 5 feet deep. The duration of the flooding may exceed 1 month. The soil dries slowly after heavy rains. The shrink-swell potential is moderate. Plants generally are adversely affected by a lack of water during dry periods in the summer and fall of most years.

Most areas of this soil are used as woodland and as habitat for wildlife. A few areas are used as pasture or cropland.

This soil is moderately well suited to the production of hardwoods and pine trees, such as loblolly pine, willow oak, water oak, Nuttall oak, and sweetgum. The wetness and the flooding limit the use of equipment during winter and spring. The equipment limitation can be overcome by using special equipment during wet periods or by logging during the drier periods. Compaction and the formation of ruts reduce the productivity of the soil. Compaction can be minimized by using suitable logging systems, laying out skid trails in advance, and harvesting when the soil is least susceptible to compaction. After the trees are harvested, carefully managed reforestation helps to control competition from undesirable understory plants. Proper site preparation and spraying, cutting, or girdling can eliminate unwanted weeds, brush, and trees. Only the trees that can tolerate seasonal wetness should be selected for planting. Loblolly pine and sweetgum are suitable for planting.

This soil is well suited to habitat for woodland wildlife and moderately well suited to habitat for wetland wildlife. The habitat for woodland wildlife, such as squirrels, white-tailed deer, turkey, and many species of nongame birds and animals, can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. The habitat for wetland wildlife can be improved by constructing shallow ponds, which provide open water areas for waterfowl and furbearers, such as muskrat, nutria, and otter.

This soil is moderately well suited to pasture. The chief suitable pasture plant is common bermudagrass. The main limitations are flooding and wetness during the winter and spring and droughtiness during the summer and fall. The medium fertility is a minor limitation. Grazing when the soil is wet results in puddling of the surface layer and damage to the plant community. Excess surface water can be removed by shallow ditches. The sodium in the upper part of the subsoil limits the growth of pasture plants. During periods of flooding, cattle can be moved to protected areas or to pastures at the higher elevations. Applications of fertilizer and lime are needed for optimum forage production.

This soil is poorly suited to most cultivated crops. The main management concerns are the flooding and the wetness. Other concerns are the medium fertility and the sodium in the subsoil, which limits crop production. Only late-planted crops, such as soybeans, can be grown. The flooding delays planting and damages crops in some years. It can be controlled by levees and water pumps.

This soil is poorly suited to most urban uses. It generally is not suitable as a site for dwellings. It has severe limitations if used as a site for buildings, local

roads and streets, or most kinds of sanitary facilities. The main limitations are the wetness, the slow permeability, the moderate shrink-swell potential, and low strength, which affects roads and streets. Flooding is the main hazard. Ring levees, pumps, and other water-control measures are needed to control flooding and remove excess water. Constructing on pilings or mounds can elevate buildings above the expected level of flooding. Septic tank absorption fields do not function properly during rainy periods because of the wetness and the slow permeability. Roads can be built above the expected level of flooding. Properly designing the roads helps to offset the limited ability of the soil to support a load.

The capability subclass is IVw. The woodland ordination symbol is 9W.

Dd—Dundee loam. This level, somewhat poorly drained soil is in high positions on natural levees along distributaries of the Mississippi River. Individual areas are long and narrow and range from 10 to 350 acres in size. Slopes are less than 1 percent.

Typically, the surface layer is dark grayish brown loam about 6 inches thick. The subsoil extends to a depth of about 33 inches. It is grayish brown, mottled clay loam. The substratum to a depth of about 60 inches is grayish brown, mottled very fine sandy loam. In some small areas the surface layer is silt loam or silty clay loam.

Included with this soil in mapping are a few small areas of Alligator, Sharkey, and Tensas soils. Also included are small areas of Dundee soils that are gently undulating and Dundee soils that are subject to rare or occasional flooding. Alligator and Sharkey soils are lower on the landscape than the Dundee soil. They are clayey throughout. Tensas soils are slightly lower on the landscape than the Dundee soil. They are clayey in the upper part of the subsoil. Included soils make up about 10 percent of the map unit.

The Dundee soil has a medium level of fertility. Water and air move through this soil at a moderately slow rate. Runoff is slow. A seasonal high water table is at a depth of about 1.5 to 3.5 feet during the period January through April. The shrink-swell potential is moderate. An adequate amount of water is available to plants in most years.

Most of the acreage of this soil is used as cropland. A small acreage is used as pasture or is developed for homesites.

This soil is well suited to most cultivated crops. The chief suitable crops are soybeans, cotton, corn, grain sorghum, wheat, and vegetables. The main limitation is the wetness. The medium fertility is a minor limitation. The soil is friable and can be easily kept in good tilth. It can be worked throughout a wide range in moisture content. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. A traffic pan forms easily if the soil is tilled when wet. This pan can be broken by subsoiling or chiseling when the soil is dry. The extent of surface crusting and compaction can be reduced by returning crop residue to the soil and by minimizing tillage. Crops respond well to systematically applied lime and fertilizer.

This soil is well suited to pasture. The chief suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, tall fescue, ryegrass, and white clover. Few major limitations affect the use of this soil as pasture. The wetness and the medium fertility are minor limitations. Excess surface water can be removed by shallow ditches. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition. Applications of lime and fertilizer improve fertility and increase forage production.

This soil is well suited to the production of southern hardwoods. The most common trees are willow oak, water oak, sweetgum, Nuttall oak, cherrybark oak, and American sycamore. Few major limitations affect woodland management; however, the wetness can limit the use of equipment in winter and spring. After the trees are harvested, carefully managed reforestation helps to control competition from undesirable understory plants. Proper site preparation and spraying, cutting, or girdling can eliminate unwanted weeds, brush, and trees. Planting and harvesting only during the drier periods can help to prevent compaction. Eastern cottonwood, sweetgum, and water oak are suitable for planting.

This soil is well suited to habitat for woodland and openland wildlife. The habitat for white-tailed deer, squirrels, and many species of nongame birds and animals can be improved by planting oak trees and suitable understory plants. Providing undisturbed vegetated areas around cropland and pasture can improve the habitat for rabbits, quail, and other small animals.

This soil is moderately well suited to urban uses. It has moderate limitations if used as a site for buildings and severe limitations if used as a site for local roads and streets or most kinds of sanitary facilities. The main limitations are the wetness, the moderate shrink-swell potential, the moderately slow permeability, and low strength, which affects roads and streets. Because of excess water, shallow ditches and a proper grade are needed on sites for roads and streets. Septic tank absorption fields do not function properly during rainy periods because of the wetness and the moderately slow permeability. Lagoons or self-contained disposal

units can be used to dispose of sewage properly. The adverse effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has a low shrink-swell potential.

The capability subclass is IIw. The woodland ordination symbol is 12W.

Fa—Falkner silt loam. This nearly level, somewhat poorly drained soil is on broad, slightly convex ridgetops in the uplands. Individual areas are irregular in shape and range from 20 to 500 acres in size. Slopes are long and smooth and range from 0 to 2 percent.

Typically, the surface layer is dark grayish brown silt loam about 4 inches thick. The subsoil extends to a depth of about 85 inches. It is mottled throughout. In sequence downward, it is yellowish brown silt loam, yellowish brown and grayish brown silt loam, yellowish brown silty clay, and yellowish brown and grayish brown silty clay loam.

Included with this soil in mapping are a few small areas of Guyton, Providence, and Tippah soils. Also included are small areas of Falkner soils that have slopes of more than 2 percent. The poorly drained Guyton soils are in depressions and drainageways. They are grayish and loamy throughout. Providence soils are higher on the landscape than the Falkner soil. They are loamy throughout and have a fragipan. Tippah soils are on the slightly more convex slopes. The mineralogical makeup of their subsoil differs from that of the Falkner soil. Included soils make up about 15 percent of the map unit.

The Falkner soil has a low level of fertility and a high level of exchangeable aluminum in the root zone. The aluminum is potentially toxic to most crops. Water and air move through the upper part of this soil at a moderately slow rate and through the lower part at a slow rate. Runoff is slow. A seasonal high water table is at a depth of about 1.5 to 2.5 feet during the period January through March. The shrink-swell potential is high in the subsoil.

Most of the acreage of this soil is used as woodland. A small acreage is used as pasture or is developed for homesites.

This soil is well suited to the production of loblolly pine and hardwoods. The main concerns in producing and harvesting timber are a moderate equipment limitation during wet periods, compaction, and plant competition. Conventional methods of harvesting timber generally are suitable, but the surface can become compacted if heavy planting or harvesting equipment is used when the soil is wet. The equipment limitation can be overcome by using special equipment during wet periods or by logging during the drier periods. Logging roads require suitable surfacing for year-round use. After the trees are harvested, carefully managed reforestation helps to control competition from undesirable understory plants. Proper site preparation and spraying, cutting, or girdling can eliminate unwanted weeds, brush, and trees.

This soil is well suited to habitat for woodland and openland wildlife. The habitat for woodland wildlife can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. If rotated among several small tracts of land, prescribed burning every 3 years can increase the supply of palatable deer browse and the supply of seed-producing plants for use by quail and turkey. The habitat for openland wildlife can be improved by planting grasses and seed crops in small areas around pasture and cropland and by leaving these areas undisturbed. These measures help to provide food and nesting areas for quail, rabbits, and songbirds.

This soil is well suited to pasture. The chief suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, ball clover, vetch, and singletary peas. Wheat, oats, and annual cool-season grasses, such as ryegrass, are suitable as winter forage. The main limitations are the wetness and the low fertility. Grazing when the soil is wet results in compaction of the surface layer and poor tilth. Applications of lime and fertilizer improve fertility and increase forage production. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition.

This soil is moderately well suited to most cultivated crops. The chief suitable crops are soybeans, corn, grain sorghum, cotton, and vegetables. The main management concerns are the wetness, the low fertility, and the potentially toxic level of exchangeable aluminum in the root zone. A drainage system improves the suitability for most cultivated crops and pasture plants. Minimizing tillage and returning all crop residue to the soil or regularly adding other organic material improve fertility and help to maintain tilth and the content of organic matter. Most crops respond well to systematically applied fertilizer and lime, which help to overcome the low fertility and the potentially toxic level of exchangeable aluminum in the root zone.

This soil is poorly suited to urban uses. It has severe limitations if used as a site for buildings, local roads and streets, or most kinds of sanitary facilities. The main limitations are the wetness, the slow permeability, the high shrink-swell potential, and low strength, which affects roads and streets. A drainage system is needed if buildings are constructed. Properly designing roads and streets can help to compensate for the instability of

the subsoil. Septic tank absorption fields do not function properly during rainy periods because of the wetness and the slow permeability. Lagoons or self-contained disposal units can be used to dispose of sewage properly. Properly designing foundations and footings and diverting runoff away from buildings help to prevent the structural damage caused by shrinking and swelling.

The capability subclass is IIw. The woodland ordination symbol is 8W.

Fc—Fausse clay, frequently flooded. This level, very poorly drained soil is in old channel scars and other depressional areas at the lowest elevation on alluvial plains. It is subject to ponding and is frequently flooded. Individual areas range from about 5 to 250 acres in size. Slopes are less than 1 percent.

Typically, the surface layer is very dark grayish brown muck about 2 inches thick. The next layer is dark gray clay about 5 inches thick. The subsoil extends to a depth of about 41 inches. It is gray and dark gray, mottled clay. The substratum to a depth of about 62 inches is gray, mottled clay. In a few small areas, the soil is less clayey throughout.

Included with this soil in mapping are a few small areas of Alligator, Forestdale, and Sharkey soils. The poorly drained Alligator and Sharkey soils are slightly higher on the landscape than the Fausse soil. They have cracks to a depth of 20 inches in most years. The poorly drained Forestdale soils are higher on the landscape than the Fausse soil. Also, they are less clayey throughout. Included soils make up about 10 percent of the map unit.

The Fausse soil has a high level of fertility. Water and air move through this soil at a very slow rate. The soil is frequently flooded and is ponded most of the time. Typically, the floodwater is 1 to 3 feet deep and in places is more than 15 feet deep. A seasonal high water table fluctuates between 1.5 feet below and 1.0 foot above the surface. The shrink-swell potential is very high; however, the soil seldom dries enough to shrink and crack. An adequate amount of water is available to plants in most years.

Most areas of this soil are used as woodland and as habitat for wildlife. A few areas are used for commercial timber production.

This soil is poorly suited to the production of commercial timber. The main tree planted for commercial timber is baldcypress. Other common trees are water tupelo, water locust, water hickory, black willow, and overcup oak. The soil is poorly suited to most other trees. Woodland management is difficult because of long periods of wetness and flooding, which limit the use of equipment during winter and spring. The equipment limitation can be overcome by using special equipment during wet periods or by logging during the drier periods. Only the trees that can tolerate seasonal wetness should be selected for planting.

This soil is well suited to habitat for wetland wildlife. It provides habitat for crawfish, waterfowl, many species of songbirds and wading birds, and furbearers, such as raccoons, nutria, muskrat, and otter. The habitat can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. Constructing deep ponds provides open water areas for resident and migratory waterfowl and furbearers and ensures that water is available for wildlife even during extended periods of drought.

This soil is poorly suited to pasture. The main management concerns are the wetness and the long periods of flooding and ponding. Grasses suitable for grazing grow only around the edges of the mapped areas.

This soil is not suited to cultivated crops, mainly because the wetness and the flooding are too severe. Soybeans, rice, and grain sorghum can be grown, however, if a drainage system is installed to remove excess water. A system of dikes, ditches, and water pumps is needed.

This soil is poorly suited to urban uses. It has severe limitations if used as a site for local roads and streets or most kinds of sanitary facilities. It is not suitable as a site for dwellings because of the ponding and the flooding. Other limitations are the very slow permeability, a very high shrink-swell potential, and low strength, which affects roads and streets. Ring levees, pumps, and other water-control measures are needed to control flooding and remove excess water. Buildings and roads can be constructed above the expected level of flooding and strengthened so that they can withstand the shrinking and swelling of the soil.

The capability subclass is VIIw. The woodland ordination symbol is 6W.

Fe—Foley silt loam, occasionally flooded. This level, poorly drained soil is on broad flats on low stream terraces at the elevation of flood plains. Individual areas range from 50 to more than 500 acres in size. Slopes are less than 1 percent.

Typically, the surface layer is dark grayish brown silt loam about 3 inches thick. The subsurface layer is light brownish gray, mottled silt loam about 4 inches thick. The subsoil extends to a depth of about 62 inches. It is light brownish gray, mottled silt loam in the upper part; grayish brown, mottled silty clay loam in the next part; and light olive gray, mottled silty clay loam in the lower part. Horizons with high levels of sodium extend from a depth of 21 inches to 62 inches. In some small areas

the surface layer is very fine sandy loam.

Included with this soil in mapping are a few small areas of Bursley, Deerford, and Forestdale soils. Also included, in the lower positions, are small areas of Foley soils that are frequently flooded. Bursley, Deerford, and Forestdale soils are slightly higher on the landscape than the Foley soil. Bursley and Forestdale soils do not a have high level of sodium in the upper part of the subsoil. The somewhat poorly drained Deerford soils have a subsoil that is somewhat more brown than that of the Foley soil. Included soils make up about 15 percent of the map unit.

The Foley soil has a low level of fertility and a moderately high level of exchangeable aluminum in the root zone. The aluminum is potentially toxic to some crops. Concentrations of sodium in the lower part of the subsoil restrict root development and limit the amount of water available to plants. Water and air move through this soil at a very slow rate. Water runs off the surface at a slow rate and stands in low areas for long periods after heavy rains. A fluctuating seasonal high water table is within a depth of 1 foot during the period December through April. The soil is flooded for brief to very long periods in late winter, in spring, and in early summer. The flooding occurs about 3 times in 10 years. Typically, the floodwater is 2 to 5 feet deep and in places is more than 10 feet deep. The duration of the flooding may exceed 2 months. The soil dries slowly after heavy rains. The shrink-swell potential is moderate.

Most of the acreage of this soil is used as woodland and as habitat for wildlife.

This soil is moderately well suited to woodland. The most common trees are overcup oak, water hickory, green ash, Nuttall oak, and baldcypress. Woodland management is difficult because of long periods of wetness and flooding, which severely limit the use of equipment during winter and spring. The equipment limitation can be alleviated by using special equipment during wet periods or by logging during the drier periods. Logging during the drier periods also can help to prevent compaction and the formation of ruts. Seedling mortality is moderate because of the wetness and the flooding. Only the trees that can tolerate seasonal wetness should be selected for planting. Sweetgum and American sycamore are suitable for planting.

This soil is well suited to habitat for wetland wildlife and moderately well suited to habitat for woodland wildlife. The habitat for woodland wildlife, such as squirrels, white-tailed deer, turkey, and many species of nongame birds and animals, can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. The habitat for wetland wildlife can be improved by constructing shallow ponds, which provide open water areas for waterfowl and furbearers, such as muskrat, nutria, and otter.

This soil is poorly suited to pasture. The chief suitable pasture plant is common bermudagrass. Native grasses also are suitable as forage for livestock. The main management concerns are the low fertility and the hazard of flooding.

This soil is poorly suited to most cultivated crops. The main management concerns are the wetness, the low fertility, the sodium in the subsoil, and the potentially toxic level of aluminum in the root zone. Flooding is the main hazard. Only late-planted crops, such as soybeans, can be grown. The flooding delays planting and damages crops in some years. Major flood-control measures, such as levees, are needed.

This soil is poorly suited to urban uses. It generally is not suitable as a site for dwellings. It has severe limitations if used as a site for local roads and streets or most kinds of sanitary facilities. The main limitations are the wetness, the very slow permeability, the moderate shrink-swell potential, and low strength, which affects roads and streets. Flooding is a hazard. Ring levees, pumps, and other water-control measures can help to control flooding and remove excess water. Constructing on pilings or mounds can elevate buildings above the expected level of flooding. Roads also can be built above the expected level of flooding. Properly designing the roads helps to offset the limited ability of the soil to support a load.

The capability subclass is IVw. The woodland ordination symbol is 6W.

Ff—Forestdale silty clay loam. This level, poorly drained soil is in low areas and on broad flats on low stream terraces at the elevation of flood plains. It is subject to rare flooding. Most areas are broad flats, but some are long and narrow. Individual areas range from 20 to more than 500 acres in size. Slopes are less than 1 percent.

Typically, the surface layer is light brownish gray silty clay loam about 5 inches thick. The subsoil extends to a depth of about 60 inches. It is light brownish gray and mottled. It is silty clay in the upper part and silty clay loam in the lower part. In some small areas the surface layer is silt loam.

Included with this soil in mapping are a few small areas of Bursley, Deerford, and Foley soils. Also included, in the slightly lower positions, are small areas of Forestdale soils that are frequently or occasionally flooded. Bursley and Deerford soils are slightly higher on the landscape than the Forestdale soil. Also, Bursley

soils have less clay in the upper part of the subsoil. Deerford soils have concentrations of sodium in the subsoil. Foley soils are slightly lower on the landscape than the Forestdale soil. They have a high level of sodium in the upper part of the subsoil. Included soils make up about 15 percent of the map unit.

The Forestdale soil has a medium level of fertility and a high level of exchangeable aluminum in the root zone. The aluminum is potentially toxic to most crops. Water and air move through this soil at a very slow rate. Water runs off the surface at a slow rate and stands in low areas for long periods after heavy rains. A seasonal high water table is at a depth of about 0.5 foot to 2.0 feet during the period January through April. Although it is rare, flooding can occur after high-intensity rains of long duration. The soil dries slowly after heavy rains. The shrink-swell potential is high in the subsoil. An adequate amount of water is available to plants in most years.

Most areas of this soil are used as woodland and as habitat for wildlife. A few areas are used as pasture or cropland or are developed for homesites.

This soil is moderately well suited to the production of commercial timber. The most common trees are water oak, willow oak, Nuttall oak, sugarberry, and green ash. The wetness limits the use of equipment during winter and spring. The equipment limitation can be alleviated by using special equipment during wet periods or by logging during the drier periods. Logging during the drier periods also can help to prevent compaction and the formation of ruts. Seedling mortality is moderate because of the wetness. After the trees are harvested, carefully managed reforestation helps to control competition from undesirable understory plants. Proper site preparation and spraying, cutting, or girdling can eliminate unwanted weeds, brush, and trees. Only the trees that can tolerate seasonal wetness should be selected for planting. Sweetgum, Nuttall oak, American sycamore, and eastern cottonwood are suitable for planting.

This soil is well suited to habitat for wetland wildlife and moderately well suited to habitat for woodland wildlife. The habitat for woodland wildlife, such as squirrels, white-tailed deer, turkey, and many species of nongame birds and animals, can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. The habitat for wetland wildlife can be improved by constructing shallow ponds, which provide open water areas for waterfowl and furbearers, such as muskrat, nutria, and otter.

This soil is moderately well suited to pasture. The chief suitable pasture plants are tall fescue, common bermudagrass, Dallisgrass, white clover, vetch, and red clover. The wetness is the main limitation. The medium fertility is a minor limitation. Grazing when the soil is wet results in puddling of the surface layer and damage to the plant community. Excess surface water can be removed by shallow ditches. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition. Applications of fertilizer and lime are needed for optimum forage production.

This soil is moderately well suited to most cultivated crops. The chief suitable crops are soybeans, cotton, rice, and grain sorghum. The main management concerns are the wetness, poor tilth, the medium fertility, and the potentially toxic level of aluminum in the root zone. The flooding delays planting and damages crops in some years. The soil cannot be easily kept in good tilth and can be worked only within a narrow range in moisture content. A drainage system improves the suitability for most cultivated crops and pasture plants. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. The extent of surface crusting and compaction can be reduced by returning the crop residue to the soil and by minimizing tillage. Most crops respond well to systematically applied fertilizer and lime, which help to overcome the medium fertility and the potentially toxic level of aluminum in the root zone.

This soil is poorly suited to urban uses. It has severe limitations if used as a site for buildings, local roads and streets, or most kinds of sanitary facilities. The main limitations are the wetness, the flooding, the very slow permeability, the high shrink-swell potential, and low strength, which affects roads and streets. A drainage system is needed if buildings are constructed. Septic tank absorption fields do not function properly during rainy periods because of the wetness and the very slow permeability. Lagoons or self-contained disposal units can be used to dispose of sewage properly. The adverse effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has a low shrink-swell potential.

The capability subclass is IIIw. The woodland ordination symbol is 3W.

Fh—Forestdale silty clay loam, occasionally flooded. This level, poorly drained soil is in low areas and on broad flats on low stream terraces at the elevation of flood plains. Most areas are broad flats, but some are long and narrow. Individual areas range from 20 to more than 500 acres in size. Slopes are less than 1 percent.

Typically, the surface layer is dark grayish brown silty

clay loam about 4 inches thick. The subsoil extends to a depth of about 65 inches. It is gray, mottled silty clay in the upper part; gray, mottled silty clay loam in the next part; and light brownish gray, mottled silt loam in the lower part.

Included with this soil in mapping are a few small areas of Bursley, Deerford, Foley, and Sharkey soils. Also included are small areas of Forestdale soils that have a surface layer of silt loam or that are subject to rare or frequent flooding. Bursley and Deerford soils are slightly higher on the landscape than the Forestdale soil. Also, Bursley soils have less clay in the upper part of the subsoil. Deerford soils have a high level of sodium in the subsoil. Foley soils are slightly lower on the landscape than the Forestdale soil. They have a high level of sodium in the subsoil. Sharkey soils are lower on the landscape than the Forestdale soil. The content of clay in their subsoil is more than 60 percent. Included soils make up about 15 percent of the map unit.

The Forestdale soil has a medium level of fertility and a high level of exchangeable aluminum in the root zone. The aluminum is potentially toxic to most crops. Water and air move through this soil at a very slow rate. Water runs off the surface at a slow rate and stands in low areas for long periods after heavy rains. A seasonal high water table is at a depth of about 0.5 foot to 2.0 feet during the period January through April. The soil is flooded for brief to very long periods, mainly in late winter, in spring, and in early summer. The flooding occurs about 3 times in 10 years during the cropping season. Typically, the floodwater is 2 to 5 feet deep and in places is more than 10 feet deep. The duration of the flooding may exceed 2 months. The soil dries slowly after heavy rains. The shrink-swell potential is high in the subsoil. An adequate amount of water is available to plants in most years.

Most areas of this soil are used as woodland and as habitat for wildlife. A few areas are used as pasture or cropland.

This soil is moderately well suited to the production of commercial timber. The most common trees are overcup oak, water hickory, Nuttall oak, sugarberry, green ash, and baldcypress. The wetness and the flooding limit the use of equipment during winter and spring. The equipment limitation can be alleviated by using special equipment during wet periods or by logging during the drier periods. Seedling mortality is moderate because of the wetness and the flooding. After the trees are harvested, carefully managed reforestation helps to control competition from undesirable understory plants. Proper site preparation and spraying, cutting, or girdling can eliminate unwanted weeds, brush, and trees. Only the trees that can tolerate seasonal wetness should be selected for planting. Sweetgum, Nuttall oak, American sycamore, and eastern cottonwood are suitable for planting.

This soil is well suited to habitat for wetland wildlife and moderately well suited to habitat for woodland wildlife. The habitat for woodland wildlife, such as squirrels, white-tailed deer, turkey, and many species of nongame birds and animals, can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. The habitat for wetland wildlife can be improved by constructing shallow ponds, which provide open water areas for waterfowl and furbearers, such as muskrat, nutria, and otter.

This soil is moderately well suited to pasture. The chief suitable pasture plant is common bermudagrass. Native grasses also are suitable as forage for livestock. The main limitation is the wetness. Flooding is the main hazard. The medium fertility is a minor limitation. Grazing when the soil is wet results in puddling of the surface layer and damage to the plant community. Excess surface water can be removed by shallow ditches. During periods of flooding, cattle can be moved to protected areas or to pastures at the higher elevations. Applications of fertilizer and lime are needed for optimum forage production.

This soil is poorly suited to most cultivated crops. The main management concerns are the flooding, the wetness, poor tilth, and the potentially toxic level of aluminum in the root zone. The medium fertility is a minor limitation. Only late-planted crops, such as soybeans, can be grown. The flooding delays planting and damages crops in some years. It can be controlled by levees and water pumps.

This soil is poorly suited to urban uses. It is not suitable as a site for dwellings. It has severe limitations if used as a site for buildings, local roads and streets, or most kinds of sanitary facilities. The main limitations are the flooding, the wetness, the very slow permeability, the high shrink-swell potential, and low strength, which affects roads and streets. Ring levees, pumps, and other water-control measures can help to control flooding and remove excess water. Constructing on pilings or mounds can elevate buildings above the expected level of flooding. Septic tank absorption fields do not function properly during rainy periods because of the wetness and the very slow permeability. The adverse effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has a low shrink-swell potential.

The capability subclass is IVw. The woodland ordination symbol is 3W.

Fr—Frizzell silt loam. This level, somewhat poorly drained soil is on broad flats on stream terraces. Individual areas range from 25 to 500 acres in size. Slopes are long and smooth and range from 0 to 1 percent.

Typically, the surface layer is dark grayish brown silt loam about 3 inches thick. The subsurface layer is brown, mottled silt loam about 4 inches thick. The subsoil extends to a depth of about 64 inches. It is yellowish brown silt loam and light gray silt in the upper part; dark brown, mottled silty clay loam in the next part; and yellowish brown, mottled silt loam in the lower part.

Included with this soil in mapping are a few small areas of Guyton soils and small areas of Frizzell soils that are subject to rare flooding. Also included are small areas of soils on low, rounded mounds. These soils are similar to the Frizzell soil but are moderately well drained. The poorly drained Guyton soils are slightly lower on the landscape than the Frizzell soil. They are grayish throughout. Included soils make up about 10 percent of the map unit.

The Frizzell soil has a low level of fertility and a high level of exchangeable aluminum in the root zone. The aluminum is potentially toxic to most crops. Water and air move through this soil at a slow rate. Water runs off the surface at a slow rate and stands in low areas for long periods after heavy rains. A seasonal high water table is at a depth of about 1.5 to 4.0 feet during the period December through April. The soil dries slowly after heavy rains. The shrink-swell potential is low.

Most areas of this soil are used as woodland. A few areas are used as pasture or cropland or are developed for homesites.

This soil is well suited to woodland. The main concern in producing and harvesting timber is the wetness. The equipment limitation, compaction, and plant competition are management concerns unless a drainage system is installed. The equipment limitation can be overcome by using special equipment during wet periods or by logging during the drier periods. Proper site preparation and spraying, cutting, or girdling can eliminate unwanted weeds, brush, and trees.

This soil is well suited to habitat for woodland wildlife. The habitat can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. If rotated among several small tracts of land, prescribed burning every 3 years can increase the supply of palatable deer browse and the supply of seed-producing plants for use by quail and turkey.

This soil is well suited to pasture. The chief suitable pasture plants are common bermudagrass, bahiagrass, white clover, vetch, and winterpea. The main limitation is the low fertility. Grazing when the soil is wet results in puddling of the surface layer and damage to the plant community. Excess surface water can be removed by shallow ditches. Applications of lime and fertilizer improve fertility and increase forage production.

This soil is moderately well suited to most cultivated crops. The chief suitable crops are cotton, corn, and soybeans. The main management concerns are the wetness, the low fertility, and the potentially toxic level of exchangeable aluminum. Shallow field ditches are needed to remove excess surface water. Excessive cultivation can result in the formation of a tillage pan. This pan can be broken by subsoiling when the soil is dry. Returning crop residue to the soil or regularly adding other organic material improves fertility, minimizes crusting, and increases the rate of water intake. Most crops respond well to systematically applied fertilizer and lime, which help to overcome the low fertility and the potentially toxic level of exchangeable aluminum in the root zone.

This soil is moderately well suited to urban uses. It has severe limitations if used as a site for most kinds of sanitary facilities and moderate limitations if used as a site for buildings or local roads and streets. The main limitations are the wetness and the slow permeability. A drainage system is needed if buildings are constructed. The slow permeability and the high water table increase the likelihood that septic tank absorption fields will fail. Lagoons or self-contained disposal units can be used to dispose of sewage properly.

The capability subclass is IIw. The woodland ordination symbol is 9W.

Go—Gore silt loam, 5 to 15 percent slopes. This moderately sloping to moderately steep, moderately well drained soil is on upland side slopes crossed by many well defined drainageways. Individual areas are irregular in shape and range from 15 to 75 acres in size. Slopes are short and complex.

Typically, the surface layer is dark grayish brown silt loam about 3 inches thick. The subsurface layer is brown silt loam about 3 inches thick. The subsoil to a depth of about 60 inches is red and grayish brown, mottled clay and yellowish red, mottled silty clay and clay.

Included with this soil in mapping are a few small areas of Guyton, Libuse, Tippah, and Vick soils. Also included, on narrow ridgetops, are small areas of Gore soils that have slopes of 3 to 5 percent. The poorly drained Guyton soils are in drainageways. They are grayish and loamy throughout. Libuse soils are on ridgetops. They have a fragipan. Tippah and Vick soils

are on ridgetops and the upper side slopes. They have a subsoil that is loamy in the upper part. Included soils make up about 15 percent of the map unit.

The Gore soil has a low level of fertility and a high level of exchangeable aluminum in the root zone. The aluminum is potentially toxic to most crops. Water and air move through this soil at a very slow rate. Runoff is rapid, and the hazard of water erosion is severe. The surface layer is friable, but it is somewhat difficult to keep in good tilth where it has been mixed with some of the clayey subsoil by cultivation. The shrink-swell potential is high in the subsoil.

Most areas of this soil are used as woodland or pasture. A few areas are used for cultivated crops or for building site development.

This soil is moderately well suited to woodland. The main concern in producing and harvesting timber is the clayey subsoil, which limits trafficability and results in moderate seedling mortality. Plant competition is moderate. Because the clayey subsoil is sticky when wet and the surface is subject to compaction, most planting and harvesting equipment can be used only during dry periods. Logging roads and landings can be protected against erosion by constructing diversions and by seeding cuts and fills. After the trees are harvested, carefully managed reforestation helps to control competition from undesirable understory plants. Proper site preparation and spraying, cutting, or girdling can eliminate unwanted weeds, brush, and trees.

This soil is moderately well suited to habitat for woodland wildlife. The habitat can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. If rotated among several small tracts of land, prescribed burning every 3 years can increase the supply of palatable deer browse and the supply of seed-producing plants for use by quail and turkey.

This soil is somewhat poorly suited to pasture. The chief suitable pasture plants are common bermudagrass, bahiagrass, ryegrass, crimson clover, and ball clover. The main management concerns are the low fertility and the hazard of erosion. A seedbed should be prepared on the contour or across the slope where practical. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition. Applications of fertilizer are needed for the optimum forage production.

This soil is poorly suited to most cultivated crops. The main management concerns are the slope and the severe hazard of erosion. Other concerns are the low fertility and the potentially toxic level of exchangeable aluminum in the root zone. Measures that can reduce the hazard of erosion include early fall seeding of a cover crop, minimum tillage, terraces, diversions, and grassed waterways. The soil should be tilled on the contour or across the slope. Most crops respond well to systematically applied fertilizer and lime, which help to overcome the low fertility and the potentially toxic level of exchangeable aluminum in the root zone.

This soil is poorly suited to urban uses. It has severe limitations if used as a site for buildings, local roads and streets, or most kinds of sanitary facilities. The main limitations are the slope, the high shrink-swell potential, and the very slow permeability. Properly designing foundations and footings and diverting runoff away from buildings help to prevent the structural damage caused by shrinking and swelling. Septic tank absorption fields do not function properly during rainy periods because of the very slow permeability. Lagoons or self-contained disposal units can be used to dispose of sewage properly. Preserving the existing plant cover during construction helps to control erosion. Applying fertilizer, seeding, mulching, and shaping the slopes help to establish and maintain a good plant cover.

The capability subclass is VIe. The woodland ordination symbol is 8C.

Gu—Guyton silt loam. This level, poorly drained soil is on broad flats on stream terraces and uplands. It is subject to rare flooding. Individual areas range from 25 to 500 acres in size. Slopes are less than 1 percent.

Typically, the surface layer is dark grayish brown silt loam about 4 inches thick. The subsurface layer is grayish brown, mottled silt loam about 20 inches thick. The subsoil extends to a depth of about 64 inches. It is grayish brown, mottled silt loam and silty clay loam.

Included with this soil in mapping are a few small areas of Frizzell and Libuse soils. Also included are small areas of soils on low, rounded mounds. These soils are similar to the Guyton soil, but they are moderately well drained. The somewhat poorly drained Frizzell soils are slightly higher on the landscape than the Guyton soil. Also, they contain more sand and less clay in the subsoil. Libuse soils are in the higher, more convex positions. They have a fragipan. Included soils make up about 10 percent of the map unit.

The Guyton soil has a low level of fertility and a high level of exchangeable aluminum in the root zone. The aluminum is potentially toxic to most crops. Water and air move through this soil at a slow rate. Water runs off the surface at a slow rate and stands in low areas for long periods after heavy rains. Although it is rare, flooding can occur during unusually wet periods. A fluctuating seasonal high water table is within a depth of 1.5 feet during the period December through May. The soil dries slowly after heavy rains. The shrink-swell potential is low.

Most of the acreage of this soil is used as woodland. A small acreage is used for pasture or crops or for building site development.

This soil is moderately well suited to woodland. The main concern in producing and harvesting timber is the wetness, which severely restricts the use of equipment and results in moderate seedling mortality. Competition from understory plants is severe. Conventional methods of harvesting timber generally can be used, but their use may be limited during rainy periods. These periods can occur from December through May in most years. Using standard wheeled and tracked equipment when the soil is moist causes compaction and the formation of ruts. Low-pressure ground equipment causes less damage to the soil and thus helps to maintain productivity. After the trees are harvested, carefully managed reforestation helps to control competition from undesirable understory plants.

This soil is well suited to habitat for wetland wildlife and moderately well suited to habitat for woodland wildlife. The habitat for wetland wildlife can be improved by constructing shallow ponds, which provide open water areas for waterfowl and furbearers, such as muskrat, nutria, and otter. The habitat for woodland wildlife can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. If rotated among several small tracts of land, prescribed burning every 3 years can increase the supply of palatable deer browse and the supply of seed-producing plants for use by quail and turkey.

This soil is moderately well suited to pasture. The chief suitable pasture plants are common bermudagrass, bahiagrass, white clover, vetch, and winterpea. The main limitations are the wetness and the low fertility. Grazing when the soil is wet results in puddling of the surface layer and damage to the plant community. Excess surface water can be removed by shallow ditches. Applications of lime and fertilizer improve fertility and increase forage production. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition.

This soil is moderately well suited to most cultivated crops. The chief suitable crops are soybeans, rice, corn, and grain sorghum. The main management concerns are the wetness, the low fertility, and the potentially toxic level of exchangeable aluminum in the root zone. A drainage system can improve the suitability for most cultivated crops and pasture plants. A tillage pan forms easily if the soil is tilled when wet. This pan can be broken by chiseling or subsoiling when the soil is dry. Returning crop residue to the soil or regularly adding other organic material improves fertility, minimizes crusting, and increases the rate of water intake. Most crops respond well to systematically applied fertilizer and lime, which help to overcome the low fertility and the potentially toxic level of exchangeable aluminum in the root zone.

This soil is poorly suited to urban uses. It has severe limitations if used as a site for buildings, local roads and streets, or most kinds of sanitary facilities. The main limitations are the wetness, the slow permeability, and low strength, which affects roads and streets. Flooding is the main hazard. A drainage system is needed if roads or buildings are constructed. Constructing on pilings or mounds can elevate buildings above the expected level of flooding. The slow permeability and the high water table increase the likelihood that septic tank absorption fields will fail. Lagoons or self-contained disposal units can be used to dispose of sewage properly.

The capability subclass is IIIw. The woodland ordination symbol is 9W.

GY—Guyton and Ouachita soils, frequently flooded. These poorly drained and well drained soils are on narrow flood plains along streams that drain the uplands. Individual areas are long and narrow and range from 10 to 300 acres in size. Slopes are less than 1 percent.

The composition of this map unit varies from one area to another, but mapping was controlled well enough for evaluation of the soils for the expected uses. Most mapped areas contain both Guyton and Ouachita soils, but some contain only one of the soils. Areas that contain both soils consist of about 45 percent Guyton soil and 35 percent Ouachita soil. The Guyton soil is on low flats. The Ouachita soil is on slightly convex ridges or natural levees adjacent to distributary channels.

These soils are flooded for very brief to long periods, mainly in winter, in spring, and in early summer. Typically, the floodwater is about 2 to 5 feet deep and in places is more than 10 feet deep. The duration of the flooding may be as long as a month.

The Guyton soil is poorly drained. Typically, it has a surface layer of dark brown, mottled silt loam about 5 inches thick. The subsurface layer is grayish brown and gray, mottled silt loam about 14 inches thick. The subsoil extends to a depth of about 62 inches. It is gray, mottled silt loam and silty clay loam in the upper part and grayish brown, mottled silt loam in the lower part.

The Guyton soil has a low level of fertility and a high level of exchangeable aluminum in the root zone. The aluminum is potentially toxic to most crops. Water and air move through this soil at a slow rate. Water runs off the surface at a slow rate and stands in low areas for

long periods after heavy rains. A fluctuating seasonal high water table is within a depth of 1.5 feet during the period December through May. The surface layer remains wet for long periods after heavy rains. The shrink-swell potential is low.

The Ouachita soil is well drained. Typically, it has a surface layer of dark brown silt loam about 6 inches thick. The subsoil to a depth of about 70 inches is silt loam. It is brown in the upper part and gray and mottled in the lower part. In places the surface layer is fine sandy loam or loamy fine sand.

The Ouachita soil has a low level of fertility and a high level of exchangeable aluminum in the root zone. The aluminum is potentially toxic to most crops. Water and air move through this soil at a moderately slow rate. Runoff is slow. The soil dries quickly after rains. The shrink-swell potential is low.

Included with these soils in mapping are a few small areas of Bienville, Cahaba, and Jena soils. Also included are small areas of Guyton and Ouachita soils, which are in the slightly higher positions and are only occasionally flooded. Bienville and Cahaba soils are in narrow strips on stream terraces. Bienville soils are sandy throughout, and Cahaba soils have more sand in the subsoil than the Guyton and Ouachita soils. Jena soils are in landscape positions similar to those of the Ouachita soil. They have less clay and more sand in the subsoil than the Ouachita soil. Included soils make up about 20 percent of the map unit.

Most areas of the Guyton and Ouachita soils are used as woodland. A few areas are used as pasture or cropland.

These soils are moderately well suited to woodland. The wetness and the flooding severely limit the use of equipment during winter and spring and result in moderate seedling mortality. Trafficability is poor, and compaction is a hazard when the Guyton soil is wet. The equipment limitation can be alleviated by using special equipment during wet periods or by logging during the drier periods. After the trees are harvested, carefully managed reforestation helps to control competition from undesirable understory plants. Proper site preparation and spraying, cutting, or girdling can eliminate unwanted weeds, brush, and trees. Loblolly pine and sweetgum are suitable for planting.

These soils are well suited to habitat for woodland wildlife. The Guyton soil also is well suited to habitat for wetland wildlife. The habitat for woodland wildlife can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. The habitat for wetland wildlife can be improved by constructing shallow ponds, which provide open water areas for waterfowl and furbearers, such as muskrat, nutria, and otter.

These soils are poorly suited to pasture. The chief suitable pasture grass is common bermudagrass. Native grasses also are suitable as forage for livestock if the pastures are well managed. The main management concerns are the low fertility, the wetness, and the frequent flooding. The wetness limits the choice of suitable plants and the period of grazing. Heavy applications of fertilizer or lime generally are not practical because of the frequent flooding. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition.

These soils are poorly suited to cultivated crops because of the frequent flooding. Other concerns are the wetness, the low fertility, and the potentially toxic level of exchangeable aluminum in the root zone. Most climatically adapted crops can be grown if flooding is controlled and if a drainage system is installed. Minimizing tillage and returning all crop residue to the soil or regularly adding other organic material improve fertility and help to maintain tilth and the content of organic matter. Where flooding is controlled, crops respond well to systematically applied fertilizer and lime, which help to overcome the low fertility and the potentially toxic level of exchangeable aluminum in the root zone.

These soils are poorly suited to urban uses. They are not suitable as sites for dwellings because of the frequent flooding. They have severe limitations if used as sites for local roads and streets or most kinds of sanitary facilities. The main limitations are the frequent flooding and the wetness. Other limitations are the slow or moderately slow permeability and low strength, which affects roads and streets. Ring levees, pumps, and other water-control measures are needed to control flooding and remove excess water. Constructing on pilings or mounds can elevate buildings above the expected level of flooding. Roads also can be built above the expected level of flooding. Properly designing the roads helps to offset the limited ability of the soils to support a load.

The capability subclass is Vw. The woodland ordination symbol assigned to the Guyton soil is 9W, and that assigned to the Ouachita soil is 11W.

Hw—Hollywood clay, 1 to 5 percent slopes. This gently sloping, moderately well drained soil is on broad ridgetops and on side slopes in the uplands. Individual areas range from 20 to 350 acres in size. Slopes are long and smooth.

Typically, the surface layer is very dark gray clay

about 7 inches thick. The subsurface layer is black clay about 18 inches thick. The subsoil extends to a depth of about 63 inches. It is light olive brown clay in the upper part; light olive brown and light brownish gray clay in the next part; and mottled olive, light olive brown, and olive yellow silty clay in the lower part. Soft masses and concretions of calcium carbonate are common in the subsoil. In some small areas the thickness of the surface layer combined with that of the subsurface layer is less than 20 inches.

Included with this soil in mapping are a few small areas of Bayoudan and Falkner soils. Also included are small areas of Hollywood soils that have been cut and filled during the construction of oil fields. Bayoudan and Falkner soils are slightly higher on the landscape than the Hollywood soil. They do not have a thick, dark surface layer and subsurface layer. Included soils make up about 20 percent of the map unit.

The Hollywood soil has a high level of fertility. Water and air move through this soil at a very slow rate. Runoff is medium. The surface layer is very sticky when wet and dries slowly once it has become wet. The shrink-swell potential is high.

Most areas of this soil are used as sites for oil fields or urban uses. A few areas are used as woodland or pasture.

This soil is poorly suited to urban uses. It has severe limitations if used as a site for buildings, local roads and streets, or most kinds of sanitary facilities. The main limitations are the very slow permeability, the high shrink-swell potential, and low strength, which affects roads and streets. Properly designing foundations and footings and diverting runoff away from buildings help to prevent the structural damage caused by shrinking and swelling. Septic tank absorption fields do not function properly during rainy periods because of the very slow permeability. Lagoons or self-contained disposal units can be used to dispose of sewage properly. Properly designing roads helps to offset the limited ability of the soil to support a load.

This soil is moderately well suited to woodland. The potential production of loblolly pine is moderate. The most common trees are loblolly pine, shortleaf pine, eastern redcedar, sweetgum, and southern red oak. A moderate equipment limitation, moderate seedling mortality, and moderate plant competition are the main concerns in producing and harvesting timber. The clayey texture of the surface layer limits the use of wheeled and tracked equipment. When wet or moist, unsurfaced roads and skid trails are sticky and may be impassable during rainy periods. Logging roads require suitable surfacing for year-round use. If site preparation and maintenance are not adequate, competition from undesirable plants can prevent or delay the natural or artificial establishment of trees. Site preparation, such as chopping, burning, applying herbicide, and bedding, removes debris, helps to control initial plant competition, and facilitates mechanical planting.

This soil is well suited to habitat for woodland wildlife. The habitat can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. If rotated among several small tracts of land, prescribed burning every 3 years can increase the supply of palatable deer browse and the supply of seed-producing plants for use by quail and turkey.

This soil is moderately well suited to pasture. The chief suitable pasture plants are bahiagrass, Johnsongrass, and King Ranch bluestem. Although not commonly grown, alfalfa can grow well on this soil. Wheat, oats, and annual cool-season grasses, such as ryegrass, are suitable as winter forage. The main management concerns are the clayey surface layer and erosion, which is a moderate hazard before the pasture grasses are established. Grazing when the soil is wet results in compaction and puddling of the surface layer, poor tilth, and excessive runoff. A seedbed should be prepared on the contour or across the slope where practical. Applications of nitrogen fertilizer improve the growth of forage plants. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition.

This soil is moderately well suited to most cultivated crops. The chief suitable crops are soybeans, grain sorghum, and corn. The main management concerns are poor tilth and a moderate hazard of erosion. The soil cannot be easily kept in good tilth and can be worked only within a narrow range in moisture content. It becomes cloddy if it is tilled when too wet or too dry. Measures that control erosion include early fall seeding, minimum tillage, terraces, diversions, and grassed waterways. Drop structures can be installed in grassed waterways where needed to prevent gullying. Returning all crop residue to the soil and including grasses, legumes, or a grass-legume mixture in the cropping sequence help to maintain fertility and tilth.

The capability subclass is IVe. The woodland ordination symbol is 9W.

Ke—Keithville very fine sandy loam, 1 to 5 percent slopes. This gently sloping, moderately well drained soil is on convex ridgetops and on side slopes in the uplands. Individual areas are broad and range from 5 to 350 acres in size. Slopes are generally long and smooth, but some are short and complex.

Typically, the surface layer is brown very fine sandy loam about 3 inches thick. The subsurface layer is light yellowish brown very fine sandy loam about 4 inches

thick. The subsoil extends to a depth of about 72 inches. In sequence downward, it is yellowish brown very fine sandy loam; strong brown, mottled silty clay loam; yellowish brown and mottled yellowish brown, light brownish gray, and red silty clay loam, silt, and very fine sand; and grayish brown and mottled light brownish gray and yellowish brown sandy clay.

Included with this soil in mapping are a few small areas of Malbis, Sacul, and Shatta soils. Also included are small areas of Keithville soils that have slopes of more than 5 percent. Malbis and Shatta soils are higher on the landscape than the Keithville soil. They are loamy throughout. Sacul soils are on the lower slopes. They are clayey in the upper part of the subsoil. Included soils make up about 15 percent of the map unit.

The Keithville soil has a low level of fertility and a high level of exchangeable aluminum in the root zone. The aluminum is potentially toxic to most crops. Water and air move through the upper part of this soil at a moderately slow rate and through the lower part at a very slow rate. Runoff is medium, and the hazard of water erosion is moderate. A seasonal high water table is at a depth of 2 to 3 feet during the period December through April. The soil dries quickly after rains. The shrink-swell potential is high in the lower part of the subsoil.

Most areas of this soil are used as woodland. A few areas are used as pasture or are developed for homesites.

This soil is well suited to the production of loblolly pine and hardwoods. The most common trees are shortleaf pine, sweetgum, southern red oak, white oak, and hickory. The main concerns in producing and harvesting timber are a moderate equipment limitation and the risk of compaction during wet periods. Competition from understory plants is moderate. Conventional methods of harvesting timber generally are suitable, but the surface can become compacted if heavy equipment is used when the soil is wet. The equipment limitation can be overcome by using special equipment during wet periods or by logging during the drier periods. Logging roads require suitable surfacing for year-round use. After the trees are harvested, carefully managed reforestation helps to control competition from undesirable understory plants. Site preparation, such as chopping, burning, applying herbicide, and bedding, removes debris, helps to control initial plant competition, and facilitates mechanical planting.

This soil is well suited to habitat for woodland wildlife. The habitat can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. If rotated among several small tracts of land, prescribed burning every 3 years can increase the supply of palatable deer browse and the supply of seed-producing plants for use by quail and turkey.

This soil is well suited to pasture. The chief suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, and white clover. Wheat, oats, and annual cool-season grasses, such as ryegrass, are suitable as winter forage. The main management concerns are the low fertility and erosion, which is a hazard before the pasture grasses are established. A seedbed should be prepared on the contour or across the slope where practical. Applications of lime and fertilizer improve fertility and increase forage production. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition.

This soil is moderately well suited to most cultivated crops. The chief suitable crops are soybeans, cotton, corn, grain sorghum, and wheat. The main management concerns are the hazard of erosion, the low fertility, and the potentially toxic level of exchangeable aluminum in the root zone. The soil is friable and can be easily kept in good tilth. It can be worked throughout a wide range in moisture content. Excessive cultivation can result in the formation of a tillage pan. This pan can be broken by subsoiling when the soil is dry. Minimizing tillage and returning all crop residue to the soil or regularly adding other organic material improve fertility and help to maintain tilth and the content of organic matter. Measures that can reduce the hazard of erosion include early seeding of fall grain or winter pasture grasses and minimum tillage. The soil should be tilled on the contour or across the slope. Waterways can be shaped and seeded to perennial grasses. Most crops respond well to systematically applied fertilizer and lime, which help to overcome the low fertility and the potentially toxic level of exchangeable aluminum in the root zone.

This soil is moderately well suited to urban uses. It has moderate limitations if used as a site for buildings or local roads and streets and severe limitations if used as a site for most kinds of sanitary facilities. The main limitations are the wetness, the very slow permeability, the high shrink-swell potential, and low strength, which affects roads and streets. The very slow permeability and the high water table increase the likelihood that septic tank absorption fields will fail. Lagoons or self-contained disposal units can be used to dispose of sewage properly. Properly designing roads helps to offset the limited ability of the soil to support a load. The footings and foundations of buildings can be strengthened so that they can withstand the shrinking and swelling of the subsoil.

The capability subclass is IIIe. The woodland ordination symbol is 9W.

Ks—Kisatchie-Oula complex, 8 to 40 percent slopes. These strongly sloping to steep soils are on side slopes in the uplands. The Kisatchie soil is moderately deep and well drained. It has slopes of 8 to 40 percent. The Oula soil is deep and moderately well drained. It has slopes of 8 to 30 percent. The two soils occur as areas so closely intermingled that they cannot be mapped separately at the scale selected. The mapped areas are about 45 percent Kisatchie soil and 35 percent Oula soil. They are irregular in shape and range from 10 to 350 acres in size. Slopes are generally short and complex, but some are long and smooth. Many well defined drainageways cross most areas.

Typically, the Kisatchie soil has a surface layer of very dark grayish brown fine sandy loam about 7 inches thick. The subsoil extends to a depth of about 26 inches. It is grayish brown and mottled. It is clay loam in the upper part and silty clay in the lower part. Olive gray, weathered and fractured sandstone is at a depth of about 26 inches.

The Kisatchie soil has a low level of fertility and a moderately high level of exchangeable aluminum in the root zone. The aluminum is potentially toxic to some crops. Water and air move through this soil at a very slow rate. Runoff is rapid, and the hazard of water erosion is severe. The shrink-swell potential is high. Plants generally are adversely affected by a lack of water during dry periods in the summer and fall of most years.

Typically, the Oula soil has a surface layer of dark grayish brown very fine sandy loam about 7 inches thick. The subsoil extends to a depth of about 58 inches. It is grayish brown, mottled clay. The substratum to a depth of about 72 inches is light brownish gray, mottled, stratified sandy clay loam and clay.

The Oula soil has a low level of fertility and a high level of exchangeable aluminum in the root zone. The aluminum is potentially toxic to crops. Water and air move through this soil at a very slow rate. Runoff is rapid, and the hazard of water erosion is severe. The shrink-swell potential is high.

Included with these soils in mapping are a few small areas of Guyton, Kurth, Providence, Ruston, and Smithdale soils. Also included are small areas of sandstone outcrops and small areas of gently sloping Kisatchie and Oula soils on narrow ridgetops. The poorly drained Guyton soils are in drainageways. They are grayish and loamy throughout. Providence and Ruston soils are on ridgetops. They are loamy throughout. Kurth soils are on ridgetops and the upper side slopes. They have thick layers of loamy material, which is underlain by bedrock. Smithdale soils are on the lower side slopes. They are loamy throughout. Included soils make up about 20 percent of the map unit.

Most areas of the Kisatchie and Oula soils are used as woodland. A few areas are used as pasture or as sites for dwellings.

These soils are poorly suited to woodland. The potential production of loblolly pine is moderately low. The main concerns in producing and harvesting timber are the slope and the severe hazard of erosion. Moderate plant competition, a moderate equipment limitation, and slight or moderate seedling mortality also are concerns. In places sandstone or siltstone outcrops restrict the use of equipment (fig. 4). Conventional methods of harvesting trees can be used in the more gently sloping areas but cannot be easily used in the steeper areas. Management that minimizes the risk of erosion is essential in harvesting timber. Harvesting during dry periods and properly locating skid trails, log landings, and haul roads on limited grades help to control erosion. Logging roads and landings can be protected against erosion by constructing diversions and by seeding cuts and fills. Where practical, planting the trees on the contour can help to control erosion. After the trees are harvested, carefully managed reforestation helps to control competition from undesirable understory plants. Proper site preparation and spraying, cutting, or girdling can eliminate unwanted weeds, brush, and trees.

These soils are moderately well suited to habitat for woodland wildlife. The habitat can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. If rotated among several small tracts of land, prescribed burning every 3 years can increase the supply of palatable deer browse and the supply of seed-producing plants for use by quail and turkey.

These soils are poorly suited to pasture. The chief suitable pasture plants are common bermudagrass, bahiagrass, ball clover, and crimson clover. The main limitations are the strongly sloping to steep, irregular slopes; the low fertility; and the severe hazard of erosion. The steep areas where seedbed preparation is difficult are best suited to native grasses. Applications of lime and fertilizer improve fertility and increase forage production. Proper stocking rates and pasture rotation help to keep the pasture in good condition.

These soils are not suited to cultivated crops, mainly

Figure 4.—Outcrops of sandstone and siltstone bedrock in an area of Kisatchie-Oula complex, 8 to 40 percent slopes. The outcrops restrict the use of equipment.

because slopes are generally too steep and the hazard of erosion is too severe. Other limitations are the low fertility and the rock outcrops.

These soils are poorly suited to urban uses. They have severe limitations if used as sites for buildings, local roads and streets, or most kinds of sanitary facilities. The main limitations are the slope, the high shrink-swell potential, and the very slow permeability. Erosion is a hazard in the steeper areas. Only the part of the site that is used for construction should be disturbed. Access roads can be designed so that they have an adequate cut-slope gradient. Drains can be used to control surface runoff and keep soil losses to a minimum. The slope affects the installation of septic tank absorption fields. Installing the absorption lines on the contour helps to keep the effluent from seeping to the surface in downslope areas. The adverse effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has a low shrink-swell potential.

The capability subclass is VIe. The woodland ordination symbol assigned to the Kisatchie soil is 6D, and that assigned to the Oula soil is 8C.

Ku—Kurth fine sandy loam, 1 to 5 percent slopes. This gently sloping, moderately well drained soil is on convex ridgetops and side slopes in the uplands. Individual areas are irregular in shape and range from 5 to 250 acres in size. Slopes are generally long and smooth, but some are short and complex.

Typically, the surface layer is dark brown fine sandy loam about 6 inches thick. The subsurface layer is brown fine sandy loam about 10 inches thick. The subsoil extends to a depth of about 54 inches. It is yellowish brown, mottled sandy clay loam in the upper part; mottled light brownish gray and yellowish brown clay loam in the next part; and mottled grayish brown and yellowish brown sandy clay loam in the lower part. Light brownish gray, weakly cemented sandstone is at a depth of about 54 inches.

Included with this soil in mapping are a few small areas of Keithville, Kisatchie, Ruston, and Savannah

soils. Also included are small areas of sandstone outcrop. Keithville soils are in landscape positions similar to those of the Kurth soil. They do not have bedrock within 60 inches of the surface. Kisatchie soils are on the steeper side slopes. They have sandstone or siltstone bedrock at a depth of 20 to 40 inches. Ruston and Savannah soils are on the higher ridgetops. They do not have bedrock within 60 inches of the surface. Included soils make up about 20 percent of the map unit.

The Kurth soil has a low level of fertility and a high level of exchangeable aluminum in the root zone. The aluminum is potentially toxic to most crops. The rooting depth is limited by the sandstone bedrock. Water and air move through this soil at a slow rate. Runoff is medium, and the hazard of water erosion is severe. A seasonal high water table is at a depth of about 2.5 to 3.5 feet during the period January through April. The shrink-swell potential is moderate.

Most areas of this soil are used as woodland. A few areas are used as pasture or are developed for homesites.

This soil is well suited to woodland. It has a moderately high potential for the production of loblolly pine. The most common trees are loblolly pine, shortleaf pine, southern red oak, water oak, and hickory. The main concerns in producing and harvesting timber are a slight equipment limitation during wet periods and competition from understory plants. Conventional methods of harvesting timber generally are suitable, but the surface can become compacted if heavy equipment is used during wet periods. The equipment limitation can be overcome by logging during the drier periods. After the trees are harvested, carefully managed reforestation helps to control competition from undesirable understory plants. Site preparation, such as chopping, burning, applying herbicide, and bedding, removes debris, helps to control initial plant competition, and facilitates mechanical planting.

This soil is well suited to habitat for woodland and openland wildlife. The habitat for woodland wildlife can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. If rotated among several small tracts of land, prescribed burning every 3 years can increase the supply of palatable deer browse and the supply of seed-producing plants for use by quail and turkey. The habitat for openland wildlife can be improved by providing undisturbed areas of vegetation around cropland and pasture.

This soil is well suited to pasture. The chief suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, and white clover. Wheat, oats, and annual cool-season grasses, such as ryegrass, are suitable as winter forage. The main management concerns are the low fertility and erosion, which is a hazard before the pasture grasses are established. A seedbed should be prepared on the contour or across the slope where practical. Applications of lime and fertilizer improve fertility and increase forage production. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition.

This soil is moderately well suited to most cultivated crops. The chief suitable crops are soybeans, cotton, corn, grain sorghum, and wheat. The main management concern is the severe hazard of erosion. Other concerns are the low fertility and the potentially toxic level of exchangeable aluminum in the root zone. Measures that can reduce the hazard of erosion include early seeding of fall grain or winter pasture grasses and minimum tillage. The soil should be tilled on the contour or across the slope. Waterways can be shaped and seeded to perennial grasses. Most crops respond well to systematically applied fertilizer and lime, which improve fertility and help to overcome the potentially toxic level of exchangeable aluminum in the root zone.

This soil is moderately well suited to urban uses. It has slight limitations if used as a site for buildings or local roads and streets and moderate or severe limitations if used as a site for most kinds of sanitary facilities. The main limitations are the wetness, the slow permeability, and the depth to bedrock. The slow permeability and the high water table increase the likelihood that septic tank absorption fields will fail. Self-contained disposal units can be used to dispose of sewage properly.

The capability subclass is IIIe. The woodland ordination symbol is 9A.

Le—Lexington silt loam, 1 to 3 percent slopes. This very gently sloping, well drained soil is on ridgetops in the uplands. Individual areas are oblong and range from 5 to 75 acres in size. Slopes are long and smooth.

Typically, the surface layer is dark grayish brown and dark brown silt loam about 8 inches thick. The subsoil extends to a depth of about 96 inches. It is reddish brown silt loam in the upper part; yellowish red silty clay loam, silt loam, and loam in the next part; and red sandy loam in the lower part.

Included with this soil in mapping are a few small areas of Providence and Ruston soils. Providence soils are in landscape positions similar to those of the Lexington soil. They have a fragipan. Ruston soils are on side slopes. They have more than 15 percent fine sand in the upper part of the subsoil. Included soils make up about 10 percent of the map unit.

The Lexington soil has a medium level of fertility and a moderately high level of exchangeable aluminum in the root zone. The aluminum is potentially toxic to some crops. Water and air move through the upper part of this soil at a moderate rate and through the lower part at a moderately rapid rate. Runoff is medium, and the hazard of water erosion is moderate. The soil dries quickly after rains. The shrink-swell potential is low.

Most areas of this soil are used as woodland or pasture. A few areas are developed for homesites.

This soil is well suited to woodland. Few limitations affect woodland management, but plant competition is moderate. After the trees are harvested, carefully managed reforestation helps to control competition from undesirable understory plants. Proper site preparation and spraying, cutting, or girdling can eliminate unwanted weeds, brush, and trees.

This soil is well suited to habitat for woodland and openland wildlife. The habitat for woodland wildlife can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. If rotated among several small tracts of land, prescribed burning every 3 years can increase the supply of palatable deer browse and the supply of seed-producing plants for use by quail and turkey.

This soil is well suited to pasture. The chief suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, crimson clover, ball clover, and ryegrass. Few major limitations affect the use of this soil as pasture. The medium fertility and the hazard of erosion are minor management concerns. Preparing a seedbed on the contour helps to control erosion. Applications of lime and fertilizer improve fertility and increase forage production. Proper stocking rates and pasture rotation help to keep the pasture in good condition.

This soil is well suited to most cultivated crops. The chief suitable crops are soybeans, cotton, corn, grain sorghum, and vegetables. The main management concern is the hazard of erosion. Other concerns are the medium fertility and the potentially toxic level of aluminum in the root zone. The soil is friable and can be easily kept in good tilth. It can be worked throughout a wide range in moisture content. A traffic pan forms easily if the soil is tilled when wet. This pan can be broken by subsoiling or chiseling when the soil is dry. Minimizing tillage and returning all crop residue to the soil or regularly adding other organic material improve fertility and help to maintain tilth and the content of organic matter. Most crops respond well to systematically applied fertilizer and lime, which improve fertility and help to overcome the potentially toxic level of exchangeable aluminum in the root zone.

This soil is moderately well suited to urban uses. It has slight limitations if used as a site for dwellings and moderate or severe limitations if used as a site for sanitary facilities. The moderate permeability, low strength on sites for local roads and streets, seepage, and the slope are the main limitations. Increasing the size of septic tank absorption fields helps to compensate for the moderate permeability in the subsoil. Properly designing roads helps to offset the limited ability of the soil to support a load. Seepage can be a problem where sewage lagoons or other community sewage systems are installed. It can be controlled by sealing the bottom and sides of the lagoon with impervious material.

The capability subclass is IIe. The woodland ordination symbol is 10A.

Lf—Libuse silt loam, 1 to 5 percent slopes. This gently sloping, moderately well drained soil is on broad ridgetops and side slopes in the uplands. Individual areas are irregular in shape and range from 5 to 300 acres in size. Slopes are generally short and smooth.

Typically, the surface layer is dark grayish brown silt loam about 6 inches thick. The subsurface layer is brown silt loam about 6 inches thick. The subsoil extends to a depth of about 83 inches. It is strong brown, mottled silty clay loam in the upper part; yellowish brown, mottled silt loam in the next part; and a fragipan of yellowish brown and light brownish gray, mottled, very firm, brittle silt loam in the lower part.

Included with this soil in mapping are a few small areas of Gore, Guyton, Tippah, and Vick soils. Also included are small areas of Libuse soils that have slopes of more than 5 percent. Gore soils are on side slopes. They have a clayey subsoil. The poorly drained Guyton soils are in depressions and drainageways. They are grayish throughout and do not have a fragipan. Tippah and Vick soils are in landscape positions similar to those of the Libuse soil. They are clayey in the lower part of the subsoil. Included soils make up about 15 percent of the map unit.

The Libuse soil has a medium level of fertility and a high level of exchangeable aluminum in the root zone. The aluminum is potentially toxic to most crops. The rooting depth is restricted by the fragipan. Water and air move through the upper part of this soil at a moderate rate and through the fragipan at a slow rate. Runoff is medium, and the hazard of water erosion is severe. A perched water table is above the fragipan at a depth of about 1.5 to 3.0 feet during the period January through April. The soil dries quickly after rains. The shrink-swell potential is low.

Most areas of this soil are used as woodland or pasture. A few areas are used for cultivated crops or for building site development.

This soil is well suited to the production of loblolly pine and hardwoods. The most common trees are loblolly pine, shortleaf pine, longleaf pine, sweetgum, southern red oak, white oak, and hickory. Few limitations affect woodland management; however, the risk of compaction and competition from understory plants are minor management concerns. Logging during the drier periods helps to prevent compaction. After the trees are harvested, carefully managed reforestation helps to control competition from undesirable understory plants. Site preparation, such as chopping, burning, applying herbicide, and bedding, removes debris, helps to control initial plant competition, and facilitates mechanical planting.

This soil is well suited to habitat for woodland and openland wildlife. The habitat for woodland wildlife can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. If rotated among several small tracts of land, prescribed burning every 3 years can increase the supply of palatable deer browse and the supply of seed-producing plants for use by quail and turkey. The habitat for openland wildlife can be improved by leaving undisturbed areas of vegetation around cropland and pasture to provide food and nesting areas for red fox, rabbits, quail, and songbirds.

This soil is well suited to pasture. The chief suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, and crimson clover. Wheat, oats, and annual cool-season grasses, such as ryegrass, are suitable as winter forage. Few major limitations affect the use of this soil as pasture. The medium fertility and the hazard of erosion are minor management concerns. Preparing a seedbed on the contour helps to control erosion. Applications of lime and fertilizer improve fertility and increase forage production. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition.

This soil is moderately well suited to most cultivated crops. The severe hazard of erosion is the main management concern. Other concerns are the medium fertility and the potentially toxic level of exchangeable aluminum in the root zone. The main crops are soybeans, cotton, grain sorghum, and truck crops. The soil is friable and can be easily kept in good tilth. It can be worked throughout a wide range in moisture content. Excessive cultivation can result in the formation of a tillage pan. This pan can be broken by subsoiling when the soil is dry. Minimizing tillage and returning all crop residue to the soil or regularly adding other organic material improve fertility and help to maintain tilth and the content of organic matter. Measures that can reduce the hazard of erosion include early seeding of fall grain or winter pasture grasses and minimum tillage. The soil should be tilled on the contour or across the slope. Waterways can be shaped and seeded to perennial grasses. Most crops respond well to systematically applied fertilizer and lime, which improve fertility and help to overcome the potentially toxic level of exchangeable aluminum in the root zone.

This soil is moderately well suited to urban uses. It has moderate limitations if used as a site for buildings and severe limitations if used as a site for local roads and streets or most kinds of sanitary facilities. The main limitations are the wetness, the slow permeability, and low strength, which affects roads and streets. A drainage system is needed if buildings are constructed. The slow permeability and the high water table increase the likelihood that septic tank absorption fields will fail. Lagoons or self-contained disposal units can be used to dispose of sewage properly. Properly designing roads helps to offset the limited ability of the soil to support a load. Revegetating disturbed areas around construction sites as soon as possible helps to control erosion.

The capability subclass is IIIe. The woodland ordination symbol is 9A.

Mb—Malbis fine sandy loam, 1 to 5 percent slopes. This gently sloping, moderately well drained, loamy soil is on broad ridgetops and the upper side slopes in the uplands. Individual areas are irregular in shape and range from 5 to 125 acres in size. Slopes are generally long and smooth.

Typically, the surface layer is very dark grayish brown fine sandy loam about 3 inches thick. The subsurface layer is brown fine sandy loam about 4 inches thick. The subsoil extends to a depth of about 72 inches. It is yellowish brown and light brownish gray loam, sandy clay loam and clay loam. It is mottled and has reddish nodules of plinthite in the middle and lower parts. In places the subsoil does not contain plinthite.

Included with this soil in mapping are a few small areas of Keithville, Pheba, Ruston, and Savannah soils. Keithville soils are lower on the landscape than the Malbis soil. They are clayey in the lower part of the subsoil. Pheba soils are in nearly level areas. They have a fragipan. Ruston soils are higher on the landscape than the Malbis soil. They have a reddish subsoil that does not contain plinthite. Savannah soils are in landscape positions similar to those of the Malbis soil. They have a fragipan. Included soils make up about 15 percent of the map unit.

The Malbis soil has a low level of fertility and a high

level of exchangeable aluminum in the root zone. The aluminum is potentially toxic to most crops. Water and air move through this soil at a moderately slow rate. Runoff is medium, and the hazard of water erosion is moderate. A seasonal high water table fluctuates between depths of about 2.5 and 4.0 feet during the period December through March. The soil dries quickly after rains. The shrink-swell potential is low. Plants can be adversely affected by a lack of water during dry periods in the summer and fall of some years.

Most areas of this soil are used as woodland or pasture. A few areas are developed for homesites.

This soil is well suited to the production of loblolly pine and shortleaf pine. Few limitations affect the production of timber. Compaction and plant competition are minor management concerns. Harvesting during the drier periods helps to prevent compaction. Proper site preparation and spraying, cutting, or girdling can eliminate unwanted weeds, brush, and trees.

This soil is well suited to habitat for woodland and openland wildlife. The habitat for woodland wildlife can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. If rotated among several small tracts of land, prescribed burning every 3 years can increase the supply of palatable deer browse and the supply of seed-producing plants for use by quail and turkey. The habitat for openland wildlife can be improved by planting grasses and other seed-producing plants around cropland and pasture.

This soil is well suited to pasture. The chief suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, crimson clover, ball clover, and ryegrass. The main management concerns are the low fertility and the hazard of erosion. Preparing a seedbed on the contour or across the slope helps to control erosion. Applications of lime and fertilizer improve fertility and increase forage production. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition.

This soil is moderately well suited to most cultivated crops. The chief suitable crops are soybeans, corn, cotton, and grain sorghum. The main management concern is the moderate hazard of erosion. Other concerns are the low fertility and the potentially toxic level of exchangeable aluminum. The soil is friable and can be easily kept in good tilth. It can be worked throughout a wide range in moisture content. Minimizing tillage and returning all crop residue to the soil or regularly adding other organic material improve fertility and help to maintain tilth and the content of organic matter. Measures that control erosion include early fall seeding, minimum tillage, terraces, diversions, and grassed waterways. Tilling the soil on the contour or across the slope also helps to control erosion. Most crops respond well to systematically applied fertilizer and lime, which improve fertility and help to overcome the potentially toxic level of exchangeable aluminum in the root zone.

This soil is moderately well suited to urban uses. It has slight or moderate limitations if used as a site for buildings or local roads and streets and moderate or severe limitations if used as a site for most kinds of sanitary facilities. The main limitations are the wetness, the moderately slow permeability, and the slope. A subsurface drainage system reduces the wetness. Preserving the existing plant cover during construction helps to control erosion. Septic tank absorption fields do not function properly during rainy periods because of the wetness and the moderately slow permeability. Lagoons or self-contained disposal units can be used to dispose of sewage properly.

The capability subclass is IIe. The woodland ordination symbol is 9A.

OE—Ouachita and Jena soils, frequently flooded. These well drained soils are on flood plains along streams that drain the uplands. A few well defined channels cross most areas. Individual areas are long and narrow and range from 10 to 150 acres in size. Slopes are less than 1 percent.

The composition of this map unit varies from one area to another, but mapping was controlled well enough for evaluation of the soils for the expected uses. Some mapped areas are mainly Ouachita soil, some are mainly Jena soil, and other areas contain both soils in varying proportions. Areas that contain both soils consist of about 50 percent Ouachita soil and 30 percent Jena soil. The Ouachita soil is in low and level areas. The Jena soil is on slightly convex, natural levees adjacent to stream channels.

These soils are flooded for very brief to very long periods in winter, in spring, and in early summer. The flooding occurs more often than 5 times in 10 years. Typically, the floodwater is about 2 to 5 feet deep and in places is more than 10 feet deep. The duration of the flooding may exceed 1 month.

Typically, the Ouachita soil has a surface layer of dark brown silt loam about 6 inches thick. The subsoil is brown silt loam about 44 inches thick. The substratum to a depth of about 60 inches is dark grayish brown, mottled silt loam. In places the surface layer is fine sandy loam or loamy fine sand.

The Ouachita soil has a low level of fertility and a high level of exchangeable aluminum in the root zone. The aluminum is potentially toxic to most crops. Water and air move through this soil at a moderately slow

rate. Runoff is slow. The soil dries quickly after rains. The shrink-swell potential is low.

Typically, the Jena soil has a surface layer of dark grayish brown very fine sandy loam about 5 inches thick. The subsoil extends to a depth of about 47 inches. It is brown silt loam and loam. The substratum to a depth of about 80 inches is brown and light yellowish brown loamy fine sand. In places the surface layer is fine sandy loam or loamy fine sand.

The Jena soil has a low level of fertility. Water and air move through this soil at a moderate rate. Runoff is slow. The soil dries quickly after rains. The shrink-swell potential is low.

Included with these soils in mapping are a few small areas of Bienville, Cahaba, and Guyton soils. Also included, in the slightly higher positions, are small areas of Ouachita and Jena soils that are only occasionally flooded. Bienville and Cahaba soils are in narrow strips on stream terraces. Bienville soils are sandy throughout, and Cahaba soils have a reddish subsoil. The poorly drained Guyton soils are on flats and in depressions. They are grayish throughout. Included soils make up about 20 percent of the map unit.

Most areas of the Ouachita and Jena soils are used as woodland. A few areas are used as pasture or cropland.

These soils are moderately well suited to the production of hardwoods and pine trees. The frequent flooding limits the use of equipment during winter and spring and results in moderate seedling mortality. After flooding occurs, trafficability is poor for short periods. The equipment limitation can be easily overcome by logging during the drier periods. After the trees are harvested, carefully managed reforestation helps to control competition from undesirable understory plants. Proper site preparation and spraying, cutting, or girdling can eliminate unwanted weeds, brush, and trees. Loblolly pine, sweetgum, American sycamore, and eastern cottonwood are suitable for planting.

The soils are well suited to habitat for woodland wildlife and moderately well suited to habitat for wetland wildlife. The habitat can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

These soils are moderately well suited to pasture. The main management concerns are the low fertility and the hazard of flooding. Pasture plants that can tolerate frequent flooding include bahiagrass, common bermudagrass, and native grasses. Heavy applications of fertilizer or lime generally are not practical because of the frequent flooding. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition.

These soils are poorly suited to most cultivated crops. Only short-season crops that are planted late in spring are suitable. The main management concern is the frequent flooding. Other concerns are the low fertility and the potentially toxic level of exchangeable aluminum. Most climatically adapted crops can be grown if flooding is controlled late in spring and early in summer and if a drainage system is installed. The flooding delays planting in most years and damages crops in some years. Minimizing tillage and returning all crop residue to the soil or regularly adding other organic material improve fertility and help to maintain tilth and the content of organic matter. Most crops respond well to systematically applied fertilizer and lime, which help to overcome the low fertility and the potentially toxic level of aluminum in the root zone.

These soils are poorly suited to urban uses. They are not suitable as sites for dwellings. They have severe limitations if used as sites for buildings, local roads and streets, or most kinds of sanitary facilities. The main limitation is the wetness caused by frequent flooding. Ring levees, pumps, and other water-control measures are needed to control flooding and remove excess water. Constructing on pilings or mounds can elevate buildings above the expected level of flooding.

The capability subclass is IVw. The woodland ordination symbol is 9W.

Ou—Oula fine sandy loam, 5 to 20 percent slopes. This moderately sloping to moderately steep, moderately well drained soil is on side slopes in the uplands. Well defined drainageways cross most areas. Individual areas are irregular in shape and range from 10 to 100 acres in size. Slopes are generally short and complex.

Typically, the surface layer is grayish brown fine sandy loam about 6 inches thick. The subsoil extends to a depth of about 38 inches. It is grayish brown clay in the upper part and grayish brown and light brownish gray, mottled clay in the lower part. The substratum to a depth of about 60 inches is light brownish gray, mottled sandy clay loam.

Included with this soil in mapping are a few small areas of Guyton, Kisatchie, Providence, and Smithdale soils. Also included are small areas of sandstone outcrop. The poorly drained Guyton soils are in narrow drainageways. They are grayish and loamy throughout. Kisatchie and Smithdale soils are in landscape positions similar to those of the Oula soil. Kisatchie soils are moderately deep over bedrock, and Smithdale soils are loamy throughout. Providence soils also are loamy throughout. They are on narrow ridgetops. Included soils make up about 20 percent of the map unit.

The Oula soil has a low level of fertility and a high

level of exchangeable aluminum in the root zone. The aluminum is potentially toxic to most crops. Water and air move through this soil at a very slow rate. Runoff is rapid, and the hazard of water erosion is severe. The shrink-swell potential is high in the subsoil.

Most of the acreage of this soil is used as woodland. A small acreage is used as pasture.

This soil is moderately well suited to the production of loblolly pine. The most common trees are longleaf pine, shortleaf pine, white oak, southern red oak, magnolia, and hickory. The main concerns in producing and harvesting timber are the hazard of erosion and a moderate equipment limitation, both of which are caused by the slope and the clayey subsoil. Competition from undesirable understory plants also is a management concern. Conventional methods of harvesting trees can be used in the more gently sloping areas but cannot be easily used in the steeper areas. Planting the trees on the contour can help to control erosion. Steep skid trails and firebreaks are subject to rilling and gullying unless they are protected by adequate water bars, a plant cover, or both. Logging roads and landings can be protected against erosion by constructing diversions and by seeding cuts and fills. If site preparation is not adequate, competition from undesirable plants can prevent or delay the natural or artificial reestablishment of trees.

This soil is well suited to habitat for woodland wildlife. The habitat can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. If rotated among several small tracts of land, prescribed burning every 3 years can increase the supply of palatable deer browse and the supply of seed-producing plants for use by quail and turkey.

This soil is poorly suited to pasture. The chief suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, ball clover, and crimson clover. Wheat, oats, and annual cool-season grasses, such as ryegrass, are suitable as winter forage. The main limitations are the short, complex slopes; the severe hazard of erosion; and the low fertility. A seedbed should be prepared on the contour or across the slope where practical. The use of equipment is limited by the moderately sloping to moderately steep, complex slopes. Applications of lime and fertilizer improve fertility and increase forage production. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition.

This soil generally is not suited to cultivated crops, mainly because slopes are too steep and the hazard of erosion is too severe. Other limitations are the low fertility and the potentially toxic level of exchangeable aluminum in the root zone. Close-sown crops, such as small grain, can be grown where slopes are not too steep or too irregular. Where crops are grown, erosion can be controlled by minimum tillage, terraces, diversions, and grassed waterways. Most crops respond well to systematically applied fertilizer and lime, which improve fertility and help to overcome the potentially toxic level of exchangeable aluminum in the root zone.

This soil is poorly suited to urban uses. It has severe limitations if used as a site for buildings, local roads and streets, or most kinds of sanitary facilities. The main limitations are the slope, the very slow permeability, the high shrink-swell potential, and low strength, which affects roads and streets. Erosion is a hazard in the steeper areas. Only the part of the site that is used for construction should be disturbed. Access roads can be designed so that surface runoff is controlled and cut slopes are stabilized. The very slow permeability in the subsoil increases the likelihood that septic tank absorption fields will fail. Lagoons or self-contained disposal units can be used to dispose of sewage properly. The adverse effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has a low shrink-swell potential. Properly designing roads helps to offset the limited ability of the soil to support a load.

The capability subclass is VIe. The woodland ordination symbol is 8C.

Pb—Pheba loam. This nearly level, somewhat poorly drained soil is on broad ridgetops in the uplands. Individual areas range from 5 to 350 acres in size. Slopes are long and smooth and range from 0 to 2 percent.

Typically, the surface layer is dark grayish brown loam about 4 inches thick. The subsurface layer is grayish brown loam about 4 inches thick. The subsoil extends to a depth of about 75 inches. The upper part is yellowish brown loam and light brownish gray, mottled very fine sandy loam. The lower part is a fragipan of mottled yellowish brown and brown, firm, brittle loam.

Included with this soil in mapping are a few small areas of Guyton, Malbis, and Savannah soils. Also included, on small mounds, are areas of soils that are similar to the Pheba soil but are moderately well drained. The poorly drained Guyton soils are in depressions and drainageways. Malbis and Savannah soils are in the slightly higher, more convex positions. Malbis soils do not have a fragipan, and Savannah soils have more sand and clay in the subsoil than the Pheba soil. Included soils make up about 10 percent of the map unit.

The Pheba soil has a low level of fertility and a high

level of exchangeable aluminum in the root zone. The aluminum is potentially toxic to most crops. Water and air move through the upper part of this soil at a moderate rate and through the fragipan at a moderately slow rate. Water runs off the surface at a slow rate and stands in low areas for short periods after heavy rains. A perched water table is above the fragipan at a depth of about 1.5 to 2.0 feet during the period January through March. The shrink-swell potential is low. Plants generally are adversely affected by a lack of water during dry periods in the summer and fall of most years.

Most areas of this soil are used as woodland. A few areas are used for pasture or cultivated crops or for building site development.

This soil is well suited to the production of loblolly pine and hardwoods. The most common trees are loblolly pine, shortleaf pine, sweetgum, water oak, southern red oak, and hickory. The main concern in harvesting timber is the wetness, which limits the use of equipment. The equipment limitation can be overcome by using special equipment during wet periods or by logging during the drier periods. Using standard wheeled and tracked equipment when the soil is moist causes compaction and the formation of ruts. Puddling can occur when the soil is wet. Low-pressure ground equipment causes less damage to the soil and thus helps to maintain productivity. Logging roads require suitable surfacing for year-round use. After the trees are harvested, carefully managed reforestation helps to control competition from undesirable understory plants. Site preparation, such as chopping, burning, applying herbicide, and bedding, removes debris, helps to control initial plant competition, and facilitates mechanical planting.

This soil is well suited to habitat for woodland and openland wildlife. The habitat for woodland wildlife can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. If rotated among several small tracts of land, prescribed burning every 3 years can increase the supply of palatable deer browse and the supply of seed-producing plants for use by quail and turkey. The habitat for openland wildlife can be improved by providing undisturbed areas of vegetation around cropland and pasture.

This soil is well suited to pasture. The chief suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, tall fescue, and white clover. Wheat and annual cool-season grasses, such as ryegrass, are suitable as winter forage. The main limitations are the wetness and the low fertility. Grazing when the soil is wet results in puddling of the surface layer and damage to the plant community. Excess surface water can be removed by shallow ditches. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition. Applications of lime and fertilizer improve fertility and increase forage production.

This soil is moderately well suited to most cultivated crops. The chief suitable crops are soybeans, cotton, corn, and grain sorghum. The main limitations are the wetness, the low fertility, and the potentially toxic level of exchangeable aluminum in the root zone. The soil is friable and can be easily kept in good tilth. It can be worked throughout a wide range in moisture content. Excessive cultivation can result in the formation of a tillage pan. This pan can be broken by subsoiling when the soil is dry. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Drop structures can be installed in grassed waterways where needed to prevent gullying. Minimizing tillage and returning all crop residue to the soil or regularly adding other organic material improve fertility and help to maintain tilth and the content of organic matter. Most crops respond well to systematically applied fertilizer and lime, which improve fertility and help to overcome the potentially toxic level of exchangeable aluminum in the root zone.

This soil is moderately well suited to urban uses. It has moderate limitations if used as a site for buildings and severe limitations if used as a site for local roads and streets or most kinds of sanitary facilities. The main limitations are the wetness, the moderately slow permeability, and low strength, which affects roads and streets. A drainage system is needed if buildings are constructed. The moderately slow permeability and the high water table increase the likelihood that septic tank absorption fields will fail. Lagoons or self-contained disposal units can be used to dispose of sewage properly. Properly designing roads helps to offset the limited ability of the soil to support a load.

The capability subclass is IIw. The woodland ordination symbol is 9W.

Pg—Pits, gravel. This map unit consists of open excavations from which gravel and sand have been removed. It is mainly in areas of Smithdale, Pheba, and Providence soils. Pits that are less than 4 acres in size are identified by a special symbol on the maps.

The gravelly material excavated from the pits is used as construction material. The layers of gravel are as much as 35 feet thick. In some areas sand also is obtained from the pits. The sand is suitable for use as a component of hot mix asphalt concrete and mortar sand. A mixture of sand, clay, and gravel, locally called "pit run," also is used as building material.

Included in this map unit are areas where the pits are abandoned. These areas consist of pits and spoil banks

that are 10 to 25 feet high. The surface in these areas generally is a mixture of coarse sand and gravel. Reaction is extremely acid or very strongly acid.

Most areas of this map unit support no vegetation. A few low-quality trees and sparse stands of grass grow in some of the abandoned pits. The unit generally is not suited to cropland, woodland, or pasture or to urban or recreational uses.

This map unit has not been assigned a capability subclass or a woodland ordination symbol.

Pr—Providence silt loam, 1 to 3 percent slopes. This very gently sloping, moderately well drained soil is on ridgetops in the uplands. Individual areas are irregular in shape and range from 5 to 150 acres in size. Slopes are generally short and smooth.

Typically, the surface layer is very dark grayish brown silt loam about 4 inches thick. The next layer is dark grayish brown silt loam about 4 inches thick. The subsoil extends to a depth of about 82 inches. It is yellowish red silty clay loam in the upper part; strong brown and brown silt loam in the next part; and a fragipan of dark brown, mottled silt loam and strong brown, mottled loam and sandy loam in the lower part.

Included with this soil in mapping are a few small areas of Kisatchie, Kurth, Lexington, Ruston, and Tippah soils. Also included are small areas of Providence soils that have slopes of more than 3 percent. Kisatchie soils are on side slopes. They have sandstone bedrock at a depth of 20 to 40 inches. Kurth, Lexington, Ruston, and Tippah soils do not have a fragipan. Kurth and Tippah soils are at the lower elevations, and Lexington and Ruston soils are in landscape positions similar to those of the Providence soil. Included soils make up about 15 percent of the map unit.

The Providence soil has a medium level of fertility and a moderately high level of exchangeable aluminum in the root zone. The aluminum is potentially toxic to some crops. The rooting depth is restricted by the fragipan. Water and air move through the upper part of this soil at a moderate rate and through the fragipan at a moderately slow rate. Runoff is medium, and the hazard of water erosion is moderate. A perched water table is above the fragipan at a depth of 1.5 to 3.0 feet during the period January through March. The soil dries quickly after rains. The shrink-swell potential is low. Plants generally are adversely affected by a lack of water during dry periods in the summer and fall of most years.

Most areas of this soil are used as woodland or pasture. A few areas are developed for homesites.

This soil is well suited to the production of hardwoods and pine trees. Few limitations affect woodland management; however, the wetness can restrict the use of equipment during winter and spring. Competition from understory plants is moderate. Logging only during drier periods helps to prevent compaction and the formation of ruts and helps to maintain the productivity of the soil. Competition from undesirable understory plants can be controlled by applications of herbicide and by prescribed burning.

This soil is well suited to habitat for woodland and openland wildlife. The habitat can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. If rotated among several small tracts of land, prescribed burning every 3 years can increase the supply of palatable deer browse and the supply of seed-producing plants for use by quail and turkey.

This soil is well suited to pasture. The chief suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, ryegrass, white clover, and winterpea. The main limitation is the medium fertility. Where the plant cover is not adequately maintained, erosion is a hazard. Preparing a seedbed on the contour helps to control erosion. Applications of fertilizer and lime are needed for optimum forage production. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition.

This soil is moderately well suited to most cultivated crops. The chief suitable crops are soybeans, corn, cotton, and grain sorghum. The main management concern is the moderate hazard of erosion. Other concerns are the medium fertility and the potentially toxic level of exchangeable aluminum in the root zone. The soil is friable and can be easily kept in good tilth. It can be worked throughout a wide range in moisture content. A tillage pan forms easily if the soil is tilled when wet. This pan can be broken by chiseling or subsoiling when the soil is dry. Minimizing tillage and returning all crop residue to the soil or regularly adding other organic material improve fertility and help to maintain tilth and the content of organic matter. Tilling the soil on the contour or across the slope helps to control erosion. Most crops respond well to systematically applied fertilizer and lime, which help to overcome the medium fertility and the potentially toxic level of aluminum in the root zone.

This soil is moderately well suited to urban uses. It has moderate limitations if used as a site for buildings and moderate or severe limitations if used as a site for local roads and streets or most kinds of sanitary facilities. The main limitations are the wetness, the moderately slow permeability, and low strength, which affects roads and streets. A drainage system is needed

if buildings are constructed. The moderately slow permeability and the high water table increase the likelihood that septic tank absorption fields will fail. Lagoons or self-contained disposal units can be used to dispose of sewage properly. Properly designing roads helps to offset the limited ability of the soil to support a load.

The capability subclass is IIe. The woodland ordination symbol is 9W.

Pv—Providence silt loam, 3 to 8 percent slopes. This moderately sloping, moderately well drained soil is on side slopes in the uplands. Individual areas are irregular in shape and range from 5 to 50 acres in size. Slopes are generally short and complex.

Typically, the surface layer is dark brown silt loam about 6 inches thick. The subsoil extends to a depth of about 60 inches. In sequence downward, it is yellowish red silt loam; yellowish red silty clay loam; strong brown, mottled silt loam; and a fragipan of brown, mottled silt loam and strong brown, mottled loam.

Included with this soil in mapping are a few small areas of Guyton, Kisatchie, Ruston, and Smithdale soils. Also included are small areas of Providence soils that have slopes of more than 8 percent. The poorly drained Guyton soils are in drainageways. They are grayish throughout. Kisatchie soils are in the lower landscape positions. They have sandstone bedrock at a depth of 20 to 40 inches. Ruston and Smithdale soils do not have a fragipan. Ruston soils are in landscape positions similar to those of the Providence soil, and Smithdale soils are on the lower side slopes. Included soils make up about 15 percent of the map unit.

The Providence soil has a medium level of fertility and a moderately high level of exchangeable aluminum in the root zone. The aluminum is potentially toxic to some crops. Water and air move through the upper part of this soil at a moderate rate and through the fragipan at a moderately slow rate. The rooting depth is limited by the fragipan. Runoff is rapid, and the hazard of water erosion is severe. A perched water table is above the fragipan at a depth of about 1.5 to 3.0 feet during the period January through March. The soil dries quickly after rains. The shrink-swell potential is low.

Most areas of this soil are used as woodland or pasture. A few areas are developed for homesites.

This soil is well suited to the production of hardwoods and pine trees. Few major limitations affect woodland management. Wetness in winter and spring can restrict the use of equipment and increase the risk of compaction. Logging only during the drier periods can help to prevent compaction and the formation of ruts. Proper site preparation and spraying, cutting, or girdling can eliminate unwanted weeds, brush, and trees.

This soil is well suited to habitat for woodland wildlife. The habitat can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. If rotated among several small tracts of land, prescribed burning every 3 years can increase the supply of palatable deer browse and the supply of seed-producing plants for use by quail and turkey.

This soil is moderately well suited to pasture. The chief suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, ryegrass, white clover, and winterpea. The main limitations are the medium fertility and the severe hazard of erosion. A seedbed should be prepared on the contour or across the slope where practical. Applications of fertilizer and lime are needed for optimum forage production. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition.

This soil is moderately well suited to most cultivated crops. The chief suitable crops are soybeans, corn, cotton, and grain sorghum. The main management concern is the severe hazard of erosion. Other concerns are the medium fertility and the potentially toxic level of aluminum in the root zone. The soil is friable and can be easily kept in good tilth. It can be worked throughout a wide range in moisture content. A tillage pan forms easily if the soil is tilled when wet. This pan can be broken by chiseling or subsoiling when the soil is dry. Minimizing tillage and returning all crop residue to the soil or regularly adding other organic material improve fertility and help to maintain tilth and the content of organic matter. The soil should be tilled on the contour or across the slope. Most crops respond well to systematically applied fertilizer and lime, which help to overcome the medium fertility and the potentially toxic level of aluminum in the root zone.

This soil is moderately well suited to urban uses. It has moderate limitations if used as a site for buildings and moderate or severe limitations if used as a site for local roads and streets or most kinds of sanitary facilities. The main limitations are the wetness, the moderately slow permeability, the slope, and low strength, which affects roads and streets. A drainage system is needed if buildings are constructed. The moderately slow permeability and the high water table increase the likelihood that septic tank absorption fields will fail. Lagoons or self-contained disposal units can be used to dispose of sewage properly. Erosion is a hazard in the steeper areas. Only the part of the site that is used for construction should be disturbed.

Establishing plants is difficult in areas where the surface layer has been removed and the fragipan has been exposed. Mulching and applying fertilizer in cut areas help to establish plants.

The capability subclass is IIIe. The woodland ordination symbol is 9W.

Rs—Ruston fine sandy loam, 1 to 3 percent slopes. This very gently sloping, well drained soil is on ridgetops in the uplands. Individual areas are irregular in shape and range from 5 to 250 acres in size. Slopes are generally long and smooth.

Typically, the surface layer is very dark grayish brown fine sandy loam about 5 inches thick. The subsurface layer is brown fine sandy loam about 4 inches thick. The subsoil extends to a depth of about 75 inches. It is red clay loam and sandy clay loam in the upper part, red fine sandy loam in the next part, and red sandy clay loam in the lower part.

Included with this soil in mapping are a few small areas of Lexington, Malbis, Providence, and Smithdale soils. Also included are small areas of Ruston soils that have slopes of more than 3 percent. Lexington soils are in the slightly higher positions. They have less than 15 percent fine sand in the upper part of the subsoil. Malbis soils are on the less convex slopes. They have a subsoil that is browner than that of the Ruston soil and has more than 5 percent plinthite. Providence soils are in landscape positions similar to those of the Ruston soil. They have a fragipan. Smithdale soils are on side slopes. They do not have a bisequum in the subsoil. Included soils make up about 10 percent of the map unit.

The Ruston soil has a low level of fertility and a high level of exchangeable aluminum in the root zone. The aluminum is potentially toxic to most crops. Water and air move through this soil at a moderate rate. Runoff is medium, and the hazard of water erosion is moderate. The soil dries quickly after rains. The shrink-swell potential is low.

Most areas of this soil are used as woodland or pasture. A few areas are developed for homesites.

This soil is well suited to the production of commercial loblolly pine, shortleaf pine, and longleaf pine. Few limitations affect woodland management.

This soil is well suited to habitat for woodland and openland wildlife. The habitat can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. If rotated among several small tracts of land, prescribed burning every 3 years can increase the supply of palatable deer browse and the supply of seed-producing plants for use by quail and turkey.

This soil is well suited to pasture. The chief suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, and crimson clover. Wheat and annual cool-season grasses, such as ryegrass, are suitable as winter forage. The main limitation is the low fertility. Erosion is a hazard if the plant cover is not adequate. A seedbed should be prepared on the contour or across the slope where practical. Applications of lime and fertilizer improve fertility and increase forage production. Proper stocking rates and pasture rotation help to keep the pasture in good condition.

This soil is moderately well suited to most cultivated crops. The chief suitable crops are soybeans, corn, cotton, and vegetables. The main management concern is the moderate hazard of erosion. Other concerns are the low fertility and the potentially toxic level of exchangeable aluminum in the root zone. The soil is friable and can be easily kept in good tilth. It can be worked throughout a wide range in moisture content. Minimizing tillage and returning all crop residue to the soil or regularly adding other organic material improve fertility and help to maintain tilth and the content of organic matter. Measures that control erosion include early fall seeding, minimum tillage, terraces, diversions, and grassed waterways. The soil should be tilled on the contour or across the slope. Most crops respond well to systematically applied fertilizer and lime, which improve fertility and help to overcome the potentially toxic level of exchangeable aluminum in the root zone.

This soil is well suited to urban uses. Few limitations affect these uses. The main limitations are the moderate permeability, the slope, and low strength, which affects local roads and streets. Plans for the development of sites for dwellings should provide for the preservation of as many trees as possible. Applying fertilizer, seeding, mulching, and shaping the slopes help to establish and maintain a good plant cover. If septic tank absorption fields are installed, the restricted permeability can be easily overcome by increasing the size of the absorption field. Properly designing roads helps to offset the somewhat limited ability of the soil to support a load.

The capability subclass is IIe. The woodland ordination symbol is 9A.

Rt—Ruston fine sandy loam, 3 to 8 percent slopes. This moderately sloping, well drained soil is on narrow ridgetops and side slopes in the uplands. Individual areas are irregular in shape and range from 5 to 100 acres in size. Slopes are generally short and complex.

Typically, the surface layer is very dark grayish brown fine sandy loam about 6 inches thick. The subsurface layer is brown fine sandy loam about 6

inches thick. The subsoil extends to a depth of about 75 inches. It is red sandy clay loam in the upper part, red fine sandy loam and pale brown loamy sand in the next part, and red sandy clay loam in the lower part.

Included with this soil in mapping are a few small areas of Lexington, Malbis, Providence, and Smithdale soils. Also included are small areas of Ruston soils that have slopes of less than 3 percent or more than 8 percent. Lexington soils are on ridgetops. They have less than 15 percent fine sand in the upper part of the subsoil. Malbis soils are on the less convex slopes. They have a subsoil that is browner than that of the Ruston soil and has more than 5 percent plinthite. Providence soils are in landscape positions similar to those of the Ruston soil. They have a fragipan. Smithdale soils are on the lower side slopes. They do not have a bisequum in the subsoil. Included soils make up about 15 percent of the map unit.

The Ruston soil has a low level of fertility and a high level of exchangeable aluminum in the root zone. The aluminum is potentially toxic to most crops. Water and air move through this soil at a moderate rate. Runoff is rapid, and the hazard of water erosion is severe. The soil dries quickly after rains. The shrink-swell potential is low.

Most of the acreage of this soil is used as woodland. A small acreage is used as cropland or pasture.

This soil is well suited to the production of commercial loblolly pine, shortleaf pine, and longleaf pine. Few limitations affect woodland management.

This soil is well suited to habitat for most kinds of woodland and openland wildlife. The habitat can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. If rotated among several small tracts of land, prescribed burning every 3 years can increase the supply of palatable deer browse and the supply of seed-producing plants for use by quail and turkey.

This soil is moderately well suited to most cultivated crops. The chief suitable crops are corn, soybeans, cotton, and vegetables. The main management concerns are the short, complex slopes; the low fertility; the potentially toxic level of exchangeable aluminum; and the severe hazard of erosion. The soil is friable and can be easily kept in good tilth. It can be worked throughout a wide range in moisture content. Minimizing tillage and returning all crop residue to the soil or regularly adding other organic material improve fertility and help to maintain tilth and the content of organic matter. Measures that control erosion include early fall seeding, minimum tillage, terraces, diversions, and grassed waterways. Most crops respond well to systematically applied fertilizer and lime, which improve fertility and help to overcome the potentially toxic level of exchangeable aluminum in the root zone.

This soil is moderately well suited to pasture. The chief suitable pasture plants are common bermudagrass, improved bermudagrass (fig. 5), bahiagrass, and crimson clover. The main limitations are the slope, the low fertility, and the hazard of erosion. A seedbed should be prepared on the contour or across the slope where practical. Applications of lime and fertilizer improve fertility and increase forage production.

This soil is moderately well suited to urban uses. The main limitations are the short, complex slopes and the hazard of erosion. Other limitations are the moderate permeability and low strength, which affects local roads and streets. Preserving the existing plant cover during construction helps to control erosion. Applying fertilizer, seeding, mulching, and shaping the slopes help to establish and maintain a good plant cover. The distribution lines in septic tank absorption fields should be installed on the contour where possible. Increasing the size of the absorption field helps to overcome the restricted permeability. Properly designing roads helps to offset the somewhat limited ability of the soil to support a load.

The capability subclass is IIIe. The woodland ordination symbol is 9A.

Sa—Sacul fine sandy loam, 1 to 5 percent slopes. This gently sloping, moderately well drained soil is on convex ridgetops and side slopes in the uplands. Individual areas are irregular in shape and range from 10 to 150 acres in size. Slopes are generally long and smooth, but some are short and complex.

Typically, the surface layer is dark grayish brown fine sandy loam about 3 inches thick. The subsurface layer is brown fine sandy loam about 6 inches thick. The subsoil extends to a depth of about 49 inches. It is red clay in the upper part; mottled light brownish gray and red clay in the next part; and mottled light brownish gray, strong brown, and reddish brown clay loam and loam in the lower part. The substratum to a depth of about 63 inches is stratified light brownish gray and strong brown sandy loam.

Included with this soil in mapping are a few small areas of Keithville, Malbis, and Ruston soils. These soils are in the slightly higher positions on ridgetops. They have less clay in the subsoil than the Sacul soil. Included soils make up about 10 percent of the map unit.

The Sacul soil has a low level of fertility and a high level of exchangeable aluminum in the root zone. The aluminum is potentially toxic to most crops. Water and air move through this soil at a slow rate. Runoff is

Figure 5.—An area of Ruston fine sandy loam, 3 to 8 percent slopes. Improved bermudagrass grows well on this soil.

medium, and the hazard of water erosion is severe. A seasonal high water table is at a depth of about 2 to 4 feet during the period December through April. The soil dries quickly after rains. The shrink-swell potential is high in the subsoil.

Most areas of this soil are used as woodland. A few areas are used as pasture or are developed for homesites.

This soil is well suited to the production of pine trees. The most common trees are loblolly pine, shortleaf pine, southern red oak, hickory, and white oak. The main concerns in planting and harvesting trees are a moderate equipment limitation caused by the clayey subsoil and moderate competition from understory plants. Logging roads and landings can be protected against erosion by constructing diversions and by seeding cuts and fills. Properly designed road drainage systems and properly located culverts can help to control erosion. After the trees are harvested, carefully managed reforestation helps to control competition from undesirable understory plants. If site preparation is not adequate, competition from undesirable plants can prevent or delay the natural or artificial reestablishment of trees. Intensive site preparation and maintenance generally are not needed.

This soil is well suited to habitat for woodland and openland wildlife. The habitat for woodland wildlife can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. If rotated among several small tracts of land, prescribed burning every 3 years can increase the supply of palatable deer browse and the supply of seed-producing plants for use by quail and turkey. The habitat for openland wildlife can be improved by maintaining undisturbed areas of

vegetation around pastures to provide food and nesting sites.

This soil is moderately well suited to pasture. The chief suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, and crimson clover. Wheat, oats, and annual cool-season grasses, such as ryegrass, are suitable as winter forage. The main management concerns are the low fertility and erosion, which is a hazard before the pasture grasses are established. A seedbed should be prepared on the contour or across the slope where practical. Applications of lime and fertilizer improve fertility and increase forage production. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition.

This soil is poorly suited to most cultivated crops. The chief suitable crops are soybeans, grain sorghum, and corn. The main management concern is the severe hazard of erosion. Other concerns are the low fertility and the potentially toxic level of exchangeable aluminum in the root zone. The soil is friable and can be easily kept in good tilth. It can be worked throughout a wide range in moisture content. Excessive cultivation can result in the formation of a tillage pan. This pan can be broken by subsoiling when the soil is dry. Minimizing tillage and returning all crop residue to the soil or regularly adding other organic material improve fertility and help to maintain tilth and the content of organic matter. Measures that can reduce the hazard of erosion include early seeding of fall grain or winter pasture grasses and minimum tillage. The soil should be tilled on the contour or across the slope. Waterways can be shaped and seeded to perennial grasses. Most crops respond well to systematically applied fertilizer and lime, which improve fertility and help to overcome the potentially toxic level of exchangeable aluminum in the root zone.

This soil is poorly suited to most urban uses. It has severe limitations if used as a site for buildings, local roads and streets, or most kinds of sanitary facilities. The main limitations are the wetness, the slow permeability, the high shrink-swell potential, and low strength, which affects roads and streets. The slow permeability and the high water table increase the likelihood that septic tank absorption fields will fail. Lagoons or self-contained disposal units can be used to dispose of sewage properly. Properly designing foundations and footings and diverting runoff away from buildings help to prevent the structural damage caused by shrinking and swelling. Properly designing roads helps to offset the limited ability of the soil to support a load.

The capability subclass is IIIe. The woodland ordination symbol is 8C.

Sb—Sacul fine sandy loam, 5 to 20 percent slopes. This moderately sloping to moderately steep, moderately well drained soil is on side slopes in the uplands. Many well defined drainageways cross most areas. Individual areas are irregular in shape and range from 10 to 200 acres in size. Slopes are generally short and complex.

Typically, the surface layer is grayish brown fine sandy loam about 4 inches thick. The subsoil extends to a depth of about 51 inches. It is yellowish red, mottled clay in the upper part and mottled yellowish brown and light brownish gray clay loam in the lower part. The substratum to a depth of about 68 inches is stratified light brownish gray sandy clay loam and yellowish brown sandy loam.

Included with this soil in mapping are a few small areas of Guyton, Keithville, and Smithdale soils. Also included, on narrow ridgetops, are small areas of Sacul soils that have slopes of 3 to 5 percent. The poorly drained Guyton soils are in narrow drainageways. They are grayish and loamy throughout. Keithville soils are on narrow ridgetops. They are loamy in the upper part of the subsoil. Smithdale soils are in landscape positions similar to those of the Sacul soil. They are reddish and loamy throughout. Included soils make up about 15 percent of the map unit.

The Sacul soil has a low level of fertility and a high level of exchangeable aluminum in the root zone. The aluminum is potentially toxic to most crops. Water and air move through this soil at a slow rate. Runoff is rapid, and the hazard of water erosion is severe. A seasonal high water table is at a depth of about 2 to 4 feet during the period December through April. The soil dries quickly after rains. The shrink-swell potential is high in the subsoil.

Most of the acreage of this soil is used as woodland. A small acreage is used as pasture.

This soil is well suited to the production of commercial pine trees. The most common trees are loblolly pine, shortleaf pine, white oak, southern red oak, magnolia, and hickory. The main concerns in producing and harvesting timber are a moderate hazard of erosion caused by the slope, a moderate equipment limitation caused by the clayey subsoil, and moderate competition from understory plants. Steep skid trails and firebreaks are subject to rilling and gullying unless they are protected by adequate water bars, a plant cover, or both. Logging roads and landings can be protected against erosion by constructing diversions and by seeding cuts and fills. If site preparation is not adequate, competition from undesirable plants can prevent or delay the natural or artificial reestablishment of trees. Intensive site preparation and maintenance generally are not needed.

This soil is well suited to habitat for woodland wildlife. The habitat can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. Leaving as many oak trees and other hardwoods as possible when timber is harvested helps to maintain the habitat. If rotated among several small tracts of land, prescribed burning every 3 years can increase the supply of palatable deer browse and the supply of seed-producing plants for use by quail and turkey. Many areas of this soil are suitable for the construction of small ponds, which can provide open water areas for fish, waterfowl, and furbearers, such as muskrat, mink, and raccoon.

This soil is moderately well suited to pasture. The chief suitable pasture plants are common bermudagrass, bahiagrass, and crimson clover. Wheat, oats, and annual cool-season grasses, such as ryegrass, are suitable as winter forage. The main limitations are the short, complex slopes; the severe hazard of erosion; and the low fertility. A seedbed should be prepared on the contour or across the slope where practical. The use of equipment is limited by the moderately sloping to moderately steep, complex slopes. Applications of lime and fertilizer improve fertility and increase forage production. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition.

This soil is not suited to cultivated crops, mainly because the slopes are generally too steep and the hazard of erosion is too severe. Other limitations are the low fertility and the potentially toxic level of exchangeable aluminum in the root zone. Close-sown crops, such as small grain, can be grown where the slopes are not too steep or too irregular. Measures that control erosion include early fall seeding, minimum tillage, terraces, diversions, and grassed waterways. Most crops respond well to systematically applied fertilizer and lime, which improve fertility and help to overcome the potentially toxic level of exchangeable aluminum in the root zone.

This soil is poorly suited to urban uses. It has severe limitations if used as a site for buildings, local roads and streets, or most kinds of sanitary facilities. The main limitations are the slope, the wetness, the slow permeability, the high shrink-swell potential, and low strength, which affects roads and streets. Erosion is a hazard in the steeper areas. Only the part of the site that is used for construction should be disturbed. Access roads can be designed so that surface runoff is controlled and cut slopes are stabilized. The slow permeability and the high water table increase the likelihood that septic tank absorption fields will fail. Lagoons or self-contained disposal units can be used to dispose of sewage properly. The adverse effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has a low shrink-swell potential. Properly designing roads helps to offset the limited ability of the soil to support a load.

The capability subclass is VIe. The woodland ordination symbol is 8C.

Sf—Savannah fine sandy loam, 1 to 5 percent slopes. This gently sloping, moderately well drained soil is on broad ridgetops and side slopes in the uplands. Individual areas range from 10 to 200 acres in size. Slopes are long and smooth.

Typically, the surface layer is dark grayish brown fine sandy loam about 5 inches thick. The subsurface layer is light yellowish brown fine sandy loam about 5 inches thick. The upper part of the subsoil is yellowish brown, mottled fine sandy loam and loam. The lower part to a depth of about 65 inches is a fragipan of mottled yellowish brown, strong brown, and light brownish gray, firm, brittle sandy clay loam and loam.

Included with this soil in mapping are a few small areas of Malbis, Pheba, and Ruston soils. Also included are small areas of Savannah soils that have slopes of more than 5 percent. Malbis soils are in landscape positions similar to those of the Savannah soil. They do not have a fragipan. The somewhat poorly drained Pheba soils are in the more nearly level areas. They have less clay and less sand in the subsoil than the Savannah soil. Ruston soils are on the more convex slopes. They do not have a fragipan. Included soils make up about 15 percent of the map unit.

The Savannah soil has a low level of fertility and a high level of exchangeable aluminum in the root zone. The aluminum is potentially toxic to most crops. The rooting depth is restricted by the fragipan. Water and air move through the upper part of this soil at a moderate rate and through the fragipan at a moderately slow rate. Runoff is medium, and the hazard of water erosion is moderate. A perched water table is above the fragipan at a depth of about 1.5 to 3.0 feet during the period January through March. The soil dries quickly after rains. The shrink-swell potential is low.

Most areas of this soil are used as woodland. A few areas are used for pasture or cultivated crops or for building site development.

This soil is well suited to the production of pine and hardwood timber. The most common trees are loblolly pine, shortleaf pine, longleaf pine, sweetgum, southern red oak, white oak, and hickory. The main concerns in producing and harvesting timber are moderate plant competition and a moderate equipment limitation, which is caused by wetness. Also, the surface is subject to

compaction if heavy equipment is used when the soil is wet. Harvesting only during the drier periods can minimize compaction. After the trees are harvested, carefully managed reforestation helps to control competition from undesirable understory plants. Site preparation, such as chopping, burning, applying herbicide, and bedding, removes debris, helps to control initial plant competition, and facilitates mechanical planting.

This soil is well suited to habitat for woodland and openland wildlife. The habitat for woodland wildlife can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. If rotated among several small tracts of land, prescribed burning every 3 years can increase the supply of palatable deer browse and the supply of seed-producing plants for use by quail and turkey. The habitat for openland wildlife can be improved by planting grasses and shrubs in small areas around cropland and pasture and by leaving these areas undisturbed.

This soil is well suited to pasture. The chief suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, and white clover. Wheat, oats, and annual cool-season grasses, such as ryegrass, are suitable as winter forage. The main limitations are the low fertility and the moderate hazard of erosion. Applications of lime and fertilizer improve fertility and increase forage production. Maintaining a good plant cover helps to prevent excessive erosion. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition.

This soil is moderately well suited to most cultivated crops. The chief suitable crops are soybeans, cotton, corn, grain sorghum, and vegetables. The main management concern is the moderate hazard of erosion. Other concerns are the low fertility and the potentially toxic level of exchangeable aluminum in the root zone. The soil is friable and can be easily kept in good tilth. It can be worked throughout a wide range in moisture content. Excessive cultivation can result in the formation of a tillage pan. This pan can be broken by subsoiling when the soil is dry. Minimizing tillage and returning all crop residue to the soil or regularly adding other organic material improve fertility and help to maintain tilth and the content of organic matter. Measures that can reduce the hazard of erosion include early seeding of fall grain or winter pasture grasses and minimum tillage. The soil should be tilled on the contour or across the slope. Waterways can be shaped and seeded to perennial grasses. Most crops respond well to systematically applied fertilizer and lime, which improve fertility and help to overcome the potentially toxic level of exchangeable aluminum in the root zone.

This soil is moderately well suited to urban uses. It has moderate or severe limitations if used as a site for buildings, local roads and streets, or most kinds of sanitary facilities. The main limitations are the wetness, the moderately slow permeability, and low strength, which affects roads and streets. A drainage system is needed if buildings are constructed. The moderately slow permeability and the high water table increase the likelihood that septic tank absorption fields will fail. Lagoons or self-contained disposal units can be used to dispose of sewage properly. Properly designing roads and streets helps to offset the limited ability of the soil to support a load.

The capability subclass is IIe. The woodland ordination symbol is 9W.

Sh—Sharkey clay, frequently flooded. This level, poorly drained soil is on broad flats and in low positions on flood plains. Individual areas range from about 25 to 750 acres in size. Slopes are less than 1 percent.

Typically, the surface layer is dark gray, mottled clay about 5 inches thick. The subsoil extends to a depth of about 54 inches. It is dark gray and gray, mottled clay. The substratum to a depth of about 80 inches is stratified dark gray and gray, mottled silty clay loam and silt loam.

Included with this soil in mapping are a few small areas of Alligator, Dundee, Fausse, and Tensas soils. Also included are small areas of Sharkey soils that are gently undulating, are only occasionally flooded, or have a subsoil that is very strongly acid or strongly acid to a depth of 20 inches of more. Alligator soils are slightly higher on the landscape than the Sharkey soil. Also their subsoil is more acid. Dundee soils are in the higher positions. They are loamy throughout. The very poorly drained Fausse soils are lower on the landscape than the Sharkey soil. They do not crack to a depth of 20 inches in most years. Tensas soils are in the slightly higher positions. They have loamy layers at a depth of 20 to 36 inches. Included soils make up about 10 percent of the map unit.

The Sharkey soil has a high level of fertility. Water and air move through this soil at a very slow rate. Water runs off the surface at a slow rate and stands in low areas for long periods after heavy rains. A fluctuating seasonal high water table is within a depth of 2 feet during the period December through April. The soil is flooded for brief to very long periods in late winter, in spring, and in early summer. The flooding occurs in about 3 years out of 10 during the cropping season and in 5 or more years out of 10 on a yearly basis. Typically, the floodwater is 5 to 10 feet deep and in places is more than 12 feet deep. The duration of the

flooding can exceed 2 months. The swales are subject to shallow flooding during heavy rains. The shrink-swell potential is very high.

Most areas of this soil are used as woodland and as habitat for wildlife. A few areas are used as pasture or cropland.

This soil is poorly suited to the production of hardwoods. The most common trees are overcup oak, water hickory, green ash, water locust, black willow, and baldcypress. Because of the wetness and the frequent flooding, the seedling mortality rate is high and managing the woodland is difficult. Also, the risks of rut formation and compaction are high. The equipment limitation and the risks of rut formation and compaction can be overcome by using special equipment during wet periods or by logging during the drier periods. After the trees are harvested, carefully managed reforestation helps to control competition from undesirable understory plants. Only the trees that can tolerate seasonal wetness should be selected for planting. Eastern cottonwood and baldcypress are suitable for planting.

This soil is moderately well suited to habitat for woodland and wetland wildlife. The habitat for wetland wildlife can be improved by constructing shallow ponds, which provide open water areas for waterfowl and furbearers, such as muskrat, nutria, and otter. The habitat for woodland wildlife, such as white-tailed deer and squirrels, can be improved by planting oak trees and suitable understory plants.

This soil is poorly suited to pasture. The chief suitable pasture plant is common bermudagrass. Native grasses also are suitable as forage if grazing is well managed. The main management concerns are the frequent flooding and the wetness. The wetness limits the choice of plants that can be grown and the period of grazing. Grazing when the soil is wet results in puddling of the surface layer and damage to the plant community. During periods of flooding, cattle can be moved to protected areas or to pastures at the higher elevations. Heavy applications of fertilizer or lime generally are not practical because of the frequent flooding.

This soil is poorly suited to most cultivated crops. The main management concern is the flooding. Other concerns are the wetness and poor tilth. Only late-planted crops, such as soybeans and grain sorghum, can be grown. The flooding delays planting and damages crops in some years. It can be controlled by levees, channels, and water pumps.

This soil is poorly suited to urban uses. It generally is not suitable as a site for dwellings. It has severe limitations if used as a site for buildings, local roads and streets, or most kinds of sanitary facilities. The main limitation is the wetness, and the main hazard is the frequent flooding. Other limitations are the very high shrink-swell potential, the very slow permeability, and low strength, which affects roads and streets. Ring levees, pumps, and other water-control measures are needed to control flooding and remove excess water. Roads and streets can be built above the expected level of flooding.

The capability subclass is Vw. The woodland ordination symbol is 6W.

Sk—Shatta very fine sandy loam, 1 to 5 percent slopes. This gently sloping, moderately well drained soil is on broad ridgetops and side slopes in the uplands. Individual areas range from 25 to 350 acres in size. Slopes are long and smooth.

Typically, the surface layer is very dark grayish brown very fine sandy loam about 3 inches thick. The subsurface layer is brown very fine sandy loam about 4 inches thick. The upper part of the subsoil is yellowish brown silt loam about 19 inches thick. The lower part to a depth of about 70 inches is a fragipan of yellowish brown, mottled, very firm, very brittle loam and yellowish brown, mottled, firm, very brittle sandy clay loam.

Included with this soil in mapping are a few small areas of Keithville, Malbis, and Ruston soils. Also included are a few small areas of soils that are similar to the Shatta soil but do not have a fragipan. Keithville soils are on the lower slopes. They are clayey in the lower part of the subsoil. Malbis and Ruston soils are at the higher elevations. They do not have a fragipan. Included soils make up about 15 percent of the map unit.

The Shatta soil has a low level of fertility and a high level of exchangeable aluminum in the root zone. The aluminum is potentially toxic to most crops. The rooting depth is restricted by the fragipan. Water and air move through the upper part of this soil at a moderate rate and through the fragipan at a slow rate. Runoff is medium, and the hazard of water erosion is severe. A perched water table is above the fragipan at a depth of about 1.5 to 3.0 feet during the period December through June. The soil dries quickly after rains. The shrink-swell potential is low.

Most areas of this soil are used as woodland. A few areas are used for pasture or cultivated crops or for building site development.

This soil is well suited to the production of pine and hardwood timber. The most common trees are loblolly pine, shortleaf pine, longleaf pine, sweetgum, southern red oak, white oak, and hickory. The equipment limitation is moderate because of the wetness. Plant competition also is moderate. Using low-pressure ground equipment or harvesting only during the drier

periods can help to prevent compaction and the formation of ruts. After the trees are harvested, carefully managed reforestation helps to control competition from undesirable understory plants. Site preparation, such as chopping, burning, applying herbicide, and bedding, removes debris, helps to control initial plant competition, and facilitates mechanical planting.

This soil is well suited to habitat for woodland and openland wildlife. The habitat for woodland wildlife can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. If rotated among several small tracts of land, prescribed burning every 3 years can increase the supply of palatable deer browse and the supply of seed-producing plants for use by quail and turkey. The habitat for openland wildlife can be improved by planting seed-producing grasses around cropland or by leaving strips of unharvested crops on the fields.

This soil is well suited to pasture. The chief suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, and crimson clover. Wheat, oats, and annual cool-season grasses, such as ryegrass, are suitable as winter forage. The main management concerns are the hazard of erosion and the low fertility. Applications of lime and fertilizer improve fertility and increase forage production. Preparing a seedbed on the contour and maintaining a good plant cover help to control erosion. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition.

This soil is moderately well suited to most cultivated crops. The chief suitable crops are soybeans, cotton, corn, grain sorghum, and truck crops. The main management concerns are the severe hazard of erosion, the low fertility, and the potentially toxic level of exchangeable aluminum in the root zone. The soil is friable and can be easily kept in good tilth. It can be worked throughout a wide range in moisture content. Excessive cultivation can result in the formation of a tillage pan. This pan can be broken by subsoiling when the soil is dry. Minimizing tillage and returning all crop residue to the soil or regularly adding other organic material improve fertility and help to maintain tilth and the content of organic matter. Measures that can reduce the hazard of erosion include early seeding of fall grain or winter pasture grasses and minimum tillage. The soil should be tilled on the contour or across the slope. Waterways can be shaped and seeded to perennial grasses. Most crops respond well to systematically applied fertilizer and lime, which improve fertility and help to overcome the potentially toxic level of exchangeable aluminum in the root zone.

This soil is moderately well suited to urban uses. It has moderate or severe limitations if used as a site for buildings, local roads and streets, or most kinds of sanitary facilities. The main limitations are the wetness, the slow permeability, and low strength, which affects roads and streets. A drainage system is needed if buildings are constructed. The slow permeability and the high water table increase the likelihood that septic tank absorption fields will fail. Lagoons or self-contained disposal units can be used to dispose of sewage properly. Properly designing roads helps to offset the limited ability of the soil to support a load.

The capability subclass is IIIe. The woodland ordination symbol is 9A.

Sm—Smithdale fine sandy loam, 12 to 30 percent slopes. This moderately steep and steep, well drained soil is on side slopes in the uplands. Many well defined drainageways cross most areas. Individual areas are irregular in shape and range from 10 to 200 acres in size. Slopes are generally short and complex, but some are long and smooth.

Typically, the surface layer is dark grayish brown fine sandy loam about 7 inches thick. The subsurface layer is brown fine sandy loam about 4 inches thick. The subsoil extends to a depth of about 85 inches. It is red sandy clay loam in the upper part and red and yellowish red sandy loam in the lower part.

Included with this soil in mapping are a few small areas of Guyton, Kisatchie, Oula, Providence, and Ruston soils. Also included are a few small areas of soils that are similar to the Smithdale soil but have more than 10 percent gravel in the surface layer and subsoil. The poorly drained Guyton soils are in drainageways. They are grayish throughout. Kisatchie and Oula soils are on the lower side slopes. They have a clayey subsoil. Providence and Ruston soils are on narrow ridgetops and the upper side slopes. Providence soils have a fragipan. Ruston soils have a bisequum in the subsoil. Included soils make up about 20 percent of the map unit.

The Smithdale soil has a low level of fertility. Water and air move through this soil at a moderate rate. Runoff is rapid, and the hazard of water erosion is severe. The shrink-swell potential is low.

Most of the acreage of this soil is used as woodland. A small acreage is used as pasture or is developed for homesites.

This soil is moderately well suited to the production of loblolly pine, shortleaf pine, and longleaf pine. The main concerns in producing and harvesting timber are the slope and the hazard of erosion. Management that minimizes the risk of erosion is essential in harvesting timber. Harvesting during dry periods and properly

locating skid trails, log landings, and haul roads on limited grades help to control erosion. Logging roads and landings can be protected against erosion by constructing diversions and by seeding cuts and fills.

This soil is poorly suited to pasture. The chief suitable pasture plants are common bermudagrass, bahiagrass, ryegrass, and crimson clover. The main limitations are the slope, the low fertility, and the severe hazard of erosion. The use of equipment is limited by the slope. A seedbed should be prepared on the contour or across the slope where practical. Applications of lime and fertilizer improve fertility and increase forage production. Proper stocking rates and pasture rotation help to keep the pasture in good condition.

This soil is well suited to habitat for woodland wildlife. The habitat can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. If rotated among several small tracts of land, prescribed burning every 3 years can increase the supply of palatable deer browse and the supply of seed-producing plants for use by quail and turkey.

This soil generally is not suited to cultivated crops, mainly because the slopes are too steep and the hazard of erosion is too severe.

This soil is poorly suited to urban uses, mainly because of the slope. It has severe limitations if used as a site for buildings, local roads and streets, or most kinds of sanitary facilities. Erosion is a severe hazard. Because of the slope, the effluent from septic tank absorption fields can seep at points downslope. Installing the absorption lines on the contour helps to control seepage. If the density of housing is moderate or high, community sewage systems are needed to prevent the contamination of water supplies resulting from seepage. Access roads can be designed so that they have an adequate cut-slope grade. Drains are needed to control surface runoff and keep soil losses to a minimum. Topsoil can be stockpiled and used to reclaim areas that have been cut and filled.

The capability subclass is VIe. The woodland ordination symbol is 9R.

Te—Tensas silty clay, occasionally flooded. This level, somewhat poorly drained soil is in low positions on natural levees along distributaries of the Mississippi River. Individual areas are long and narrow and range from 10 to 250 acres in size. Slopes are less than 1 percent.

Typically, the surface layer is dark gray silty clay about 4 inches thick. The subsoil extends to a depth of about 61 inches. It is grayish brown, mottled clay in the upper part; dark grayish brown, mottled silty clay in the next part; and grayish brown, mottled loam in the lower part. The substratum to a depth of about 88 inches is grayish brown, mottled very fine sandy loam.

Included with this soil in mapping are a few small areas of Alligator, Dundee, and Sharkey soils. Also included are small areas of Tensas soils that are gently undulating, are frequently flooded, or have a slightly acid or neutral subsoil within 20 inches of the surface. Alligator and Sharkey soils are lower on the landscape than the Tensas soil. They are clayey throughout. Dundee soils are in the slightly higher positions. They are loamy throughout. Included soils make up about 10 percent of the map unit.

The Tensas soil has a medium level of fertility. Water and air move through the upper part of this soil at a very slow rate and through the lower part at a moderately slow rate. Runoff is slow. A seasonal high water table fluctuates between depths of about 1 and 3 feet during the period December through April. The soil is flooded for brief to long periods in late winter, in spring, and in early summer. The flooding occurs about 3 times in 10 years during the cropping season and as often as 5 times in 10 years during winter and spring. Typically, the floodwater is 2 to 5 feet deep and in places is more than 10 feet deep. The surface layer is very sticky when wet and very hard when dry. The shrink-swell potential is very high.

Most areas of this soil are used for cultivated crops, mainly soybeans. Some areas are used as woodland, pasture, or habitat for wildlife. Some have been developed for homesites.

This soil is poorly suited to most cultivated crops. The chief suitable crops are soybeans and grain sorghum. The main management concerns are the flooding, the wetness, and poor tilth. The medium fertility is a minor limitation. The flooding delays planting and damages crops in some years. It can be controlled by levees, channels, and water pumps. The soil cannot be easily kept in good tilth and can be worked only within a narrow range in moisture content. It becomes cloddy if it is tilled when too wet or too dry. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Minimizing tillage and returning all crop residue to the soil or regularly adding other organic material improve fertility and help to maintain tilth and the content of organic matter. Most crops respond well to applications of fertilizer. Generally, lime also is needed.

This soil is moderately well suited to the production of southern hardwoods. The most common trees are Nuttall oak, water oak, sweetgum, sugarberry, willow oak, and water hickory. The main concerns in producing and harvesting timber are the flooding, the wetness, and poor trafficability. The wetness and the flooding

severely limit the use of equipment during winter and spring and result in moderate seedling mortality. Using special equipment during wet periods or logging only during the drier periods helps to prevent compaction and the formation of ruts. Using low-pressure ground equipment also minimizes soil damage and helps to maintain productivity. After the trees are harvested, carefully managed reforestation helps to control competition from undesirable understory plants. Only the trees that can tolerate seasonal wetness should be selected for planting. Eastern cottonwood and baldcypress are suitable for planting.

This soil is moderately well suited to pasture. The chief suitable pasture plant is common bermudagrass. The main limitations are the flooding, the wetness, and the clayey surface layer. The medium fertility is a minor limitation. The flooding can be controlled by levees and water pumps. Excess surface water can be removed by shallow ditches. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition. Applications of lime and fertilizer improve fertility and increase forage production.

This soil is well suited to habitat for woodland and wetland wildlife. The habitat for woodland wildlife, such as squirrels and white-tailed deer, can be improved by planting oak trees and suitable understory plants. The habitat for wetland wildlife can be improved by constructing shallow ponds, which provide open water areas for waterfowl and furbearers, such as muskrat, nutria, and otter.

This soil is poorly suited to urban uses. It has severe limitations if used as a site for buildings, local roads and streets, or most kinds of sanitary facilities. The main limitations are the flooding, the wetness, the very slow permeability, the very high shrink-swell potential, and low strength, which affects roads and streets. Ring levees, pumps, and other water-control measures are needed to control flooding and remove excess water. Roads and streets can be built above the expected level of flooding. Because of excess water, shallow ditches and a proper grade are needed. Septic tank absorption fields do not function properly during rainy periods because of the wetness and the very slow permeability. Lagoons or self-contained disposal units can be used to dispose of sewage properly. The adverse effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has a low shrink-swell potential.

The capability subclass is IVw. The woodland ordination symbol is 3W.

Tp—Tippah silt loam, 1 to 5 percent slopes. This gently sloping, moderately well drained soil is on convex ridgetops and side slopes in the uplands. Individual areas are irregular in shape and range from 5 to 450 acres in size. Slopes are generally long, smooth, and convex.

Typically, the surface layer is yellowish brown silt loam about 5 inches thick. The subsoil extends to a depth of about 70 inches. It is strong brown and yellowish red, mottled silt loam in the upper part; mottled yellowish brown, light brownish gray, red, and light yellowish brown silty clay in the next part; and pale olive, mottled silty clay in the lower part.

Included with this soil in mapping are a few small areas of Bayoudan, Falkner, and Providence soils. Also included are small areas of Tippah soils that have slopes of more than 5 percent. Bayoudan soils are at the lower elevations. They are clayey throughout. Falkner soils are on the less convex slopes. They do not have grayish mottles within 30 inches of the surface. Providence soils are at the higher elevations. They are loamy throughout and have a fragipan. Included soils make up about 15 percent of the map unit.

The Tippah soil has a medium level of fertility and a high level of exchangeable aluminum in the root zone. The aluminum is potentially toxic to most crops. Water and air move through the upper part of this soil at a moderate rate and through the lower part at a slow rate. Runoff is medium, and the hazard of water erosion is moderate. A seasonal high water table is at a depth of about 2.0 to 2.5 feet during the period December through April. The soil dries quickly after rains. The shrink-swell potential is high in the lower part of the subsoil.

Most areas of this soil are used as woodland. A few areas are used for pasture or cultivated crops or for building site development.

This soil is well suited to the production of loblolly pine and hardwoods. The most common trees are loblolly pine, cherrybark oak, white oak, and sweetgum. Few limitations affect woodland management, but competition from understory plants is moderate. Conventional methods of harvesting timber generally are suitable, but the surface can become compacted if heavy equipment is used when the soil is wet. After the trees are harvested, carefully managed reforestation helps to control competition from undesirable understory plants. Site preparation, such as chopping, burning, applying herbicide, and bedding, removes debris, helps to control initial plant competition, and facilitates mechanical planting.

This soil is well suited to habitat for woodland and openland wildlife. The habitat for woodland wildlife can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the

natural establishment of desirable plants. If rotated among several small tracts of land, prescribed burning every 3 years can increase the supply of palatable deer browse and the supply of seed-producing plants for use by quail and turkey. The habitat for openland wildlife can be improved by leaving strips of unharvested crops on the field.

This soil is well suited to pasture. The chief suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, and crimson clover. Wheat, oats, and annual cool-season grasses, such as ryegrass, are suitable as winter forage. The main management concerns are the medium fertility and erosion, which is a moderate hazard before the pasture grasses are established. A seedbed should be prepared on the contour or across the slope where practical. Applications of lime and fertilizer improve fertility and increase forage production. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition.

This soil is moderately well suited to most cultivated crops. The chief suitable crops are soybeans, cotton, corn, grain sorghum, and wheat. The main management concerns are the moderate hazard of erosion, the medium fertility, and the potentially toxic level of exchangeable aluminum in the root zone. The soil is friable and can be easily kept in good tilth. It can be worked throughout a wide range in moisture content. Excessive cultivation can result in the formation of a tillage pan. This pan can be broken by subsoiling when the soil is dry. Minimizing tillage and returning all crop residue to the soil or regularly adding other organic material improve fertility and help to maintain tilth and the content of organic matter. Measures that can reduce the hazard of erosion include early seeding of fall grain or winter pasture grasses and minimum tillage. The soil should be tilled on the contour or across the slope. Waterways can be shaped and seeded to perennial grasses. Most crops respond well to systematically applied fertilizer and lime, which improve fertility and help to overcome the potentially toxic level of exchangeable aluminum in the root zone.

This soil is poorly suited to urban uses. It has severe limitations if used as a site for buildings, local roads and streets, or most kinds of sanitary facilities. The main limitations are the wetness, the slow permeability, the high shrink-swell potential, and low strength, which affects roads and streets. The slow permeability and the high water table increase the likelihood that septic tank absorption fields will fail. Lagoons or self-contained disposal units can be used to dispose of sewage properly. Properly designing foundations and footings and diverting runoff away from buildings help to prevent the structural damage caused by shrinking and swelling. Properly designing roads helps to offset the limited ability of the soil to support a load.

The capability subclass is IIe. The woodland ordination symbol is 8A.

Un—Una silty clay loam, frequently flooded. This level, poorly drained soil is on flood plains along the major streams. Individual areas are generally broad and range from 10 to 400 acres in size. Slopes are less than 1 percent.

Typically, the surface layer is very dark grayish brown silty clay loam about 2 inches thick. The subsurface layer is dark grayish brown silty clay loam about 4 inches thick. The subsoil extends to a depth of about 78 inches. It is dark gray and gray, mottled silty clay in the upper part; light brownish gray, mottled silty clay in the next part; and light brownish gray, mottled silty clay loam in the lower part.

Included with this soil in mapping are a few small areas of Bienville, Cahaba, Fausse, Guyton, and Zenoria soils. Also included are small areas of sandy soils adjacent to the Little River. Bienville, Cahaba, and Zenoria soils are on narrow terraces. They are less clayey throughout than the Una soil. The very poorly drained Fausse soils are in small depressional areas. They are ponded most of the time. Guyton soils are slightly higher on the landscape than the Una soil. They are loamy throughout. Included soils make up about 15 percent of the map unit.

The Una soil has a low level of fertility and a high level of exchangeable aluminum in the root zone. The aluminum is potentially toxic to most crops. Water and air move through this soil at a very slow rate. Water runs off the surface at a very slow rate and stands in low areas for long periods after heavy rains. A seasonal high water table is at a depth of about 0.5 to 1.0 foot during the period November through April. The soil is flooded for long and very long periods in winter, in spring, and in early summer. The flooding occurs more often than 5 times in 10 years. Typically, the floodwater is 3 to 8 feet deep and in places is more than 12 feet deep. The duration of the flooding may exceed 6 months. The soil dries slowly after heavy rains. The shrink-swell potential is high. An adequate amount of water is available to plants in most years.

Most of the acreage of this soil is used as woodland. A small acreage is used as pasture.

This soil is poorly suited to the production of hardwoods. The most common trees are overcup oak, water hickory, baldcypress, green ash, and sweetgum. The understory vegetation is mainly swamp privet, water elm, mayhaw, and green hawthorn. The main concerns in producing and harvesting timber are a severe equipment limitation and a high seedling

mortality rate, both of which are caused by the wetness and the frequent flooding. The risks of rut formation and compaction are high. Competition from understory plants is moderate. The equipment limitation and the risks of rut formation and compaction can be overcome by using special equipment during wet periods or by logging during the drier periods. Site preparation, such as chopping, burning, applying herbicide, and bedding, removes debris, helps to control initial plant competition, and facilitates mechanical planting. The seedling survival rate is low because of the frequent flooding. Only the trees that can tolerate seasonal wetness should be selected for planting. Sweetgum, green ash, water tupelo, and baldcypress are suitable for planting.

This soil is moderately well suited to habitat for woodland wildlife and well suited to habitat for wetland wildlife. The habitat for woodland wildlife can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. The habitat for wetland wildlife can be improved by constructing shallow ponds, which provide open water areas for waterfowl and furbearers, such as muskrat, nutria, and otter.

This soil is poorly suited to pasture and cultivated crops. The main management concerns are the wetness and the frequent flooding. Most climatically adapted crops and pasture grasses can be grown if flooding is controlled and if a drainage system is installed. The low fertility, poor tilth, and the potentially toxic level of exchangeable aluminum, however, are continuing limitations.

This soil is poorly suited to urban uses. It is not suitable as a site for dwellings. It has severe limitations if used as a site for buildings, local roads and streets, or most kinds of sanitary facilities. The main limitations are the frequent flooding and the wetness. The flooding can be controlled by levees and water pumps. Constructing on pilings or mounds can elevate buildings above the expected level of flooding. Roads and streets also can be built above the expected level of flooding. If flooding is controlled, the very slow permeability, the very high shrink-swell potential, and low strength, which affects roads and streets, are continuing limitations.

The capability subclass is Vw. The woodland ordination symbol is 3W.

Vk—Vick silt loam. This nearly level, somewhat poorly drained soil is on broad, slightly convex ridgetops in the uplands. Individual areas are irregular in shape and range from 20 to 250 acres in size. Slopes are long and smooth and range from 0 to 2 percent.

Typically, the surface layer is brown silt loam about 4 inches thick. The subsoil extends to a depth of about 80 inches. In sequence downward, it is yellowish brown, mottled silt loam; yellowish brown, mottled silt loam and light yellowish brown and light gray silt; mottled yellowish brown and grayish brown silty clay; mottled light yellowish brown, olive yellow, and light brownish gray silty clay loam and silt loam; and light brownish gray, mottled silty clay loam.

Included with this soil in mapping are a few small areas of Gore, Guyton, Libuse, and Tippah soils. Gore soils are on side slopes. They are clayey throughout the subsoil. The poorly drained Guyton soils are in depressions and drainageways. They are grayish and loamy throughout. Libuse soils are slightly higher on the landscape than the Vick soil. They have a fragipan. The moderately well drained Tippah soils are on the slightly more convex slopes. They have a subsoil in which the content of clay does not decrease by as much as 20 percent within a depth of 60 inches. Included soils make up about 15 percent of the map unit.

The Vick soil has a medium level of fertility and a high level of exchangeable aluminum in the root zone. The aluminum is potentially toxic to most crops. Water and air move through this soil at a slow rate. Runoff is slow. A seasonal high water table is at a depth of about 0.5 foot to 2.0 feet during the period December through April. The shrink-swell potential is high in the subsoil.

Most of the acreage of this soil is used as woodland. A small acreage is used as pasture or is developed for homesites.

This soil is well suited to the production of loblolly pine and hardwoods. The main concerns in producing and harvesting timber are a moderate equipment limitation and a high seedling mortality rate, both of which are caused by the wetness. Competition from understory plants is moderate. Conventional methods of harvesting timber generally are suitable, but the surface can become compacted if heavy equipment is used when the soil is wet. The equipment limitation can be overcome by using special equipment during wet periods or by logging during the drier periods. Logging roads require suitable surfacing for year-round use. After the trees are harvested, carefully managed reforestation helps to control competition from undesirable understory plants. Proper site preparation and spraying, cutting, or girdling can eliminate unwanted weeds, brush, and trees.

This soil is well suited to habitat for woodland wildlife and moderately well suited to habitat for wetland wildlife. The habitat for woodland wildlife can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. If rotated among several small tracts of land, prescribed burning every 3 years can increase the supply of palatable deer

browse and the supply of seed-producing plants for use by quail and turkey.

This soil is well suited to pasture. The chief suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, white clover, vetch, and winterpea. Wheat, oats, and annual cool-season grasses, such as ryegrass, are suitable as winter forage. The main limitations are the medium fertility and the wetness. Grazing when the soil is wet results in compaction of the surface layer and thus in reduced productivity. Applications of lime and fertilizer improve fertility and increase forage production. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition.

This soil is moderately well suited to most cultivated crops. The chief suitable crops are soybeans, corn, grain sorghum, cotton, and vegetables. The main management concerns are the wetness, the medium fertility, and the potentially toxic level of exchangeable aluminum in the root zone. A drainage system improves the suitability for most cultivated crops and pasture plants. Minimizing tillage and returning all crop residue to the soil or regularly adding other organic material improve fertility and help to maintain tilth and the content of organic matter. Most crops respond well to systematically applied fertilizer and lime, which improve fertility and help to overcome the potentially toxic level of exchangeable aluminum in the root zone.

This soil is poorly suited to urban uses. It has severe limitations if used as a site for buildings, local roads and streets, or most kinds of sanitary facilities. The main limitations are the wetness, the slow permeability, the high shrink-swell potential, and low strength, which affects roads and streets. A drainage system is needed if buildings are constructed. Properly designing roads and streets can help to compensate for the instability of the subsoil. Septic tank absorption fields do not function properly during rainy periods because of the wetness and the slow permeability. Lagoons or self-contained disposal units can be used to dispose of sewage properly. Properly designing foundations and footings and diverting runoff away from buildings help to prevent the structural damage caused by shrinking and swelling.

The capability subclass is IIw. The woodland ordination symbol is 9W.

Ze—Zenoria clay loam, occasionally flooded. This nearly level, poorly drained soil is on low stream terraces at the elevation of flood plains. Individual areas range from 5 to 250 acres in size. Slopes dominantly are less than 1 percent but range to 2 percent.

Typically, the surface layer is dark grayish brown clay loam about 2 inches thick. The subsurface layer is dark gray, mottled clay about 8 inches thick. The subsoil extends to a depth of about 67 inches. The upper part is grayish brown and light brownish gray, mottled sandy clay loam and fine sandy loam. The next part occurs as buried layers of grayish brown, mottled sandy clay loam. The lower part is light brownish gray, mottled loam. The substratum to a depth of about 80 inches is mottled light brownish gray and light olive brown loamy fine sand and fine sand.

Included with this soil in mapping are a few small areas of Bienville, Cahaba, and Una soils. Also included are small areas of Zenoria soils that are frequently flooded. Bienville and Cahaba soils are higher on the landscape than the Zenoria soil. Bienville soils are sandy throughout. Cahaba soils have a reddish subsoil. Una soils are in depressions and drainageways. They have a clayey subsoil. Included soils make up about 15 percent of the map unit.

The Zenoria soil has a low level of fertility and a high level of exchangeable aluminum in the root zone. The aluminum is potentially toxic to most crops. Water and air move through this soil at a slow rate. Water runs off the surface at a slow rate and stands in low areas for short periods after heavy rains. A seasonal high water table is at a depth of about 1.5 to 2.5 feet during the period December through April. The soil is flooded for brief to very long periods in winter, in spring, and in early summer. The flooding occurs less often than 5 times in 10 years. Typically, the floodwater is 1 to 3 feet deep. The shrink-swell potential is high.

Most areas of this soil are used as woodland and as habitat for wildlife. A small acreage is used as pasture.

This soil is moderately well suited to the production of hardwoods. The most common trees are willow oak, Nuttall oak, sweetgum, overcup oak, and green ash. Loblolly pine grows in some areas. The understory vegetation is mainly mayhaw, deciduous holly, and green hawthorn. The main concerns in producing and harvesting timber are a moderate equipment limitation, moderate seedling mortality, and high risks of rut formation and compaction. Competition from understory plants is moderate. The equipment limitation and the risks of rut formation and compaction can be overcome by using special equipment during wet periods or by logging during the drier periods. After the trees are harvested, carefully managed reforestation helps to control competition from undesirable understory plants. Site preparation, such as chopping, burning, applying herbicide, and bedding, removes debris, helps to control initial plant competition, and facilitates mechanical planting. Only the trees that can tolerate seasonal wetness should be selected for planting. Sweetgum, American sycamore, and green ash are suitable for planting.

This soil is moderately well suited to habitat for

woodland and wetland wildlife. The habitat for woodland wildlife can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. The habitat for wetland wildlife can be improved by constructing shallow ponds, which provide open water areas for waterfowl and furbearers, such as muskrat, nutria, and otter.

This soil is moderately well suited to pasture. The chief suitable pasture plants are common bermudagrass and other water-tolerant native grasses. The main limitations are the wetness and the flooding. The low fertility is a minor limitation. The wetness limits the choice of plants that can be grown and the period of grazing. During periods of flooding, cattle can be moved to protected areas or to pastures at the higher elevations. Applications of lime and fertilizer improve fertility and increase forage production. Proper grazing practices, weed control, and fertilizer are needed for optimum forage production.

This soil is poorly suited to most cultivated crops. The main management concerns are the occasional flooding, the wetness, poor tilth, the low fertility, and the potentially toxic level of exchangeable aluminum in the root zone. Only late-planted crops, such as soybeans, can be grown. The soil cannot be easily kept in good tilth and can be worked only within a narrow range in moisture content. It becomes cloddy if it is tilled when too wet or too dry. The flooding delays planting and damages crops in some years. It can be controlled by levees and water pumps. Minimizing tillage and returning all crop residue to the soil or regularly adding other organic material improve fertility and help to maintain tilth and the content of organic matter. Most crops respond well to systematically applied fertilizer and lime, which improve fertility and help to overcome the potentially toxic level of exchangeable aluminum in the root zone.

This soil is poorly suited to urban uses. It generally is not suitable as a site for dwellings. It has severe limitations if used as a site for buildings, local roads and streets, or most kinds of sanitary facilities. The main limitations are the flooding, the wetness, the high shrink-swell potential, and the slow permeability. Ring levees, pumps, and other water-control measures are needed to control flooding and remove excess water. Constructing on pilings or mounds can elevate buildings above the expected level of flooding. Roads and streets also can be built above the expected level of flooding. Septic tank absorption fields do not function properly during rainy periods because of the wetness and the slow permeability. If flooding is controlled, lagoons or self-contained disposal units can be used to dispose of sewage properly. The footings and foundations of buildings can be strengthened so that they can withstand the shrinking and swelling of the soil.

The capability subclass is IVw. The woodland ordination symbol is 5W.

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in providing the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is the land that is best suited to food, feed, forage, fiber, and oilseed crops. It may be cultivated land, pasture, woodland, or other land, but it is not urban and built-up land or water areas. It either is used for food or fiber crops or is available for those crops. The soil qualities, growing season, and moisture supply are those needed for a well managed soil to produce a sustained high yield of crops in an economic manner. Prime farmland produces the highest yields with minimal inputs of energy and economic resources, and farming it results in the least damage to the environment.

Prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The level of acidity or alkalinity is acceptable. Prime farmland has few or no rocks and is permeable to water and air. It is not excessively erodible or saturated with water for long periods and is not frequently flooded during the growing season. The slope ranges mainly from 0 to 8 percent. More detailed information about the criteria for prime farmland is available at the local office of the Soil Conservation Service.

About 183,246 acres in the survey area, or nearly 45 percent of the total acreage, meets the soil requirements for prime farmland. Scattered areas of this land are throughout the parish. Only about 2,500 acres of the prime farmland is used for cultivated crops, mainly soybeans, cotton (fig. 6), and grain sorghum. Most of the prime farmland is used for commercial timber.

The map units in the survey area that are considered prime farmland are listed in table 5. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps at the back of this publication. The soil qualities that affect use

Figure 6.—Cotton in an area of Dundee loam, which is considered prime farmland.

and management are described under the heading "Detailed Soil Map Units."

Some soils that have a seasonal high water table qualify for prime farmland only in areas where this limitation has been overcome by drainage measures. The need for these measures is indicated after the map unit name in table 5. Onsite evaluation is needed to determine whether or not this limitation has been overcome by corrective measures.

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where wetness or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

John Powell, conservation agronomist, Soil Conservation Service, helped prepare this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

About 18,775 acres in La Salle Parish was used for crops or pasture in 1982. Of this total, about 6,917 acres was used for crops, mainly soybeans. About 11,858 acres was used for pasture. Until recently, the acreage used for crops steadily increased as woodland and pasture were converted to cropland. Currently, some of the marginal cropland is reverting to woodland.

Perennial grasses or legumes, or mixtures of these, are grown for pasture and hay. The mixtures generally consist of either a summer or a winter perennial grass and a suitable legume. Also, many farmers seed small grain or ryegrass in the fall for winter and spring forage. Excess grass in summer is harvested as hay for the winter.

Common and improved bermudagrass and Pensacola bahiagrass are the most commonly grown summer perennials. Improved bermudagrass and Pensacola bahiagrass produce good-quality forage (fig. 7). Tall fescue, the chief winter perennial grass, grows well only on soils that have a favorable moisture content. All of these grasses respond well to applications of fertilizer, particularly nitrogen.

White clover, crimson clover, vetch, and winterpea are the most commonly grown legumes. They respond well to applications of lime, particularly on acid soils.

Proper grazing practices are essential for high-quality forage, stand survival, and erosion control. Brush and weed control, applications of lime and fertilizer, and renovation of the pasture also are important.

Some farmers obtain additional forage by allowing their cattle to graze the native understory plants in areas of woodland. Forage production varies,

Figure 7.—A well managed pasture of bahiagrass in an area of Ruston fine sandy loam, 3 to 8 percent slopes. This pasture provides good-quality forage for cattle.

depending on the forest site, the condition of the native forage, and the density of the timber stand. Although most wooded areas are managed mainly for timber, a substantial amount of forage can be obtained from these areas under good management. Stocking rates and grazing periods should be carefully managed for optimum forage production and a cover of understory plants that prevents excessive erosion. Additional information about the production of forage in areas of woodland is given in the section "Woodland Management and Productivity."

Differences in the suitability of soils for crops and in the management needed in areas of cropland result from differences in soil characteristics, such as the fertility level, erodibility, content of organic matter, availability of water to plants, drainage, and the hazard of flooding. Cropping and tillage systems also are important parts of management. Each farm has a unique soil pattern; therefore, each has unique management problems. Some principles of farm management apply only to specific soils and certain crops. This section describes the general principles of management that can be applied widely to the soils in La Salle Parish.

Fertilization and liming. The soils in the parish range from strongly acid to moderately alkaline to a depth of 20 inches. The more acid soils may require additions of lime. The amount of fertilizer needed depends on the kind of crop, on the past cropping history, on the desired level of yield, and on the kind of soil. It should be determined on the basis of the results of soil tests. Information and instructions on collecting and testing soil samples can be obtained from the Cooperative Extension Service.

Organic matter content. Organic matter is important as a source of nitrogen for crops. It also increases the

rate of water intake, minimizes surface crusting, and improves tilth. Most soils of the parish that are used for crops are low in content of organic matter. The content can be maintained by growing crops that have an extensive root system and an abundance of foliage, by leaving plant residue on the surface, by adding barnyard manure, and by growing perennial grasses and legumes in rotation with other crops.

Soil tillage. Soils should be tilled only when seedbed preparation and weed control are needed. Excessive tillage destroys soil structure. Minimum tillage and no-till farming help to maintain soil tilth. The clayey soils in the parish become cloddy if cultivated when too wet or too dry. A compacted layer, generally known as a traffic pan or plowpan, sometimes forms directly below the plow layer in loamy soils. It can be broken up by subsoiling or chiseling. The formation of this compacted layer can be prevented by deferring plowing when the soil is wet or by varying the depth of plowing. Tillage implements that stir the surface but leave crop residue in place protect the soil from beating rains and thus help to control erosion and runoff. The crop residue minimizes surface crusting and increases the rate of water infiltration.

Drainage. On many of the soils in the parish, a surface drainage system is needed to improve the suitability for crops. The soils in high positions on natural levees and the soils in the uplands are drained by a gravity system consisting of row drains and field drains. The clayey soils in low positions on the natural levees are drained by a gravity system consisting of a series of mains, or principal pipelines, and laterals, or smaller drains that branch out from the mains. The success of the systems depends on the availability of adequate outlets. Another method used to improve drainage is land grading, which not only improves surface drainage but also eliminates cross ditches and makes longer rows possible.

Water for plant growth. The available water capacity of the soils in the parish ranges from low to high. The soils receive large amounts of rainfall in winter and spring. During dry periods in the summer and autumn of many years, however, most of the soils do not supply enough water at the critical time for optimum plant growth. As a result, an irrigation system is needed.

Cropping system. A good cropping system includes a legume, which provides nitrogen; a cultivated crop, which aids in weed control; a deep-rooted crop, which utilizes the plant nutrients in the subsoil and helps to maintain the permeability of the subsoil; and a close-growing crop, which helps to maintain the content of organic matter. The sequence of crops should keep the soil covered as much of the year as possible.

A suitable cropping system varies with the needs of the farmer and the characteristics of the soil. Livestock producers, for example, generally use cropping systems that have a higher percentage of pasture than the cropping systems of cash-crop farms. In some areas soybeans are grown year after year or in rotation with grain sorghum. Cover crops of grasses and legumes are grown during the fall and winter. Double cropping of wheat and soybeans is becoming more common in some areas.

Control of erosion. Erosion is a major hazard on many soils in the parish. It is an especially serious problem on the soils on stream terraces and uplands. It generally is not a serious hazard on the soils on alluvial plains, which generally are level or nearly level. Sheet erosion is moderately severe in all fields that have been fallow plowed and in newly constructed drainageways. Some gully erosion occurs, mainly in areas of the more sloping soils. Sheet, rill, and gully erosion can be controlled by maintaining a cover of vegetation or crop residue, by farming on the contour, by stripcropping, by applying a system of conservation tillage, and by controlling weeds through means other than fallow plowing. Newly constructed drainageways should be seeded immediately after construction. Structures that drop water to different levels in drainageways can prevent gullying.

Additional information about drainage practices, cropping systems, and erosion control can be obtained from the local office of the Soil Conservation Service or the Louisiana Agricultural Experiment Station.

Yields Per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of each map unit also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby parishes and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure,

and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use. There are no class I soils in this survey area.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production. There are no class VIII soils in this survey area.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c,* used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

The capability classification of each map unit is given in the section "Detailed Soil Map Units" and in table 6.

Woodland Management and Productivity

Carl V. Thompson, Jr., forester, Soil Conservation Service, helped prepare this section.

Soil directly influences the growth, management, harvesting, and multiple use of forests. It is the medium in which a tree is anchored and from which it draws its nutrients and moisture. Soil characteristics, such as chemical composition, texture, structure, depth, and slope position, affect tree growth, seedling survival, species suitability, and the equipment limitation.

The ability of a soil to supply moisture and nutrients to trees is strongly related to soil texture, structure, and depth. Generally, sandy soils, such as Bienville soils, are less fertile and have a lower available water capacity than clayey soils. Aeration, however, is often impeded in the clayey soils, particularly under wet conditions. The slope position strongly influences species composition and the growth rates.

These soil characteristics, in combination, largely determine the species composition of forest stands and influence management and use decisions. Sweetgum, for example, can survive on many soils and sites, but it grows best on the rich, moist, alluvial, loamy soils on bottom land along streams. The use of heavy logging and site-preparation equipment is more restricted on

clayey soils than on better drained, sandy or loamy soils.

Table 7 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for an indicator tree species. The number indicates the volume, in cubic meters per hectare per year, which the indicator species can produce. The number 1 indicates low potential productivity; 2 and 3, moderate; 4 and 5, moderately high; 6 to 8, high; 9 to 11, very high; and 12 to 39, extremely high. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *R* indicates steep slopes; *X*, stoniness or rockiness; *W*, excess water in or on the soil; *T*, toxic substances in the soil; *D*, restricted rooting depth; *C*, clay in the upper part of the soil; *S*, sandy texture; and *F*, a high content of rock fragments in the soil. The letter *A* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: R, X, W, T, D, C, S, and F.

In table 7, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Erosion hazard is the probability that damage will occur as a result of site preparation and cutting where the soil is exposed along roads, skid trails, fire lanes, and log-handling areas. Forests that have been burned or overgrazed are also subject to erosion. Ratings of the erosion hazard are based on the percent of the slope. A rating of *slight* indicates that no particular prevention measures are needed under ordinary conditions. A rating of *moderate* indicates that erosion-control measures are needed in certain silvicultural activities. A rating of *severe* indicates that special precautions are needed to control erosion in most silvicultural activities.

Equipment limitation reflects the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. The chief characteristics and conditions considered in the ratings are slope, stones on the surface, rock outcrops, soil wetness, and texture of the surface layer. A rating of *slight* indicates that under normal conditions the kind of equipment or season of use is not significantly restricted by soil factors. Soil wetness can restrict equipment use, but the wet period does not exceed 1 month. A rating of *moderate* indicates that equipment use is moderately restricted because of one or more soil factors. If the soil is wet, the wetness restricts equipment use for a period of 1 to 3 months. A rating of *severe* indicates that equipment use is severely restricted either as to the kind of equipment that can be used or the season of use. If the soil is wet, the wetness restricts equipment use for more than 3 months.

Seedling mortality refers to the death of naturally occurring or planted tree seedlings, as influenced by the kinds of soil, soil wetness, or topographic conditions. The factors used in rating the soils for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, effective rooting depth, and slope aspect. A rating of *slight* indicates that seedling mortality is not likely to be a problem under normal conditions. Expected mortality is less than 25 percent. A rating of *moderate* indicates that some problems from seedling mortality can be expected. Extra precautions are advisable. Expected mortality is 25 to 50 percent. A rating of *severe* indicates that seedling mortality is a serious problem. Extra precautions are important. Replanting may be necessary. Expected mortality is more than 50 percent.

Plant competition ratings indicate the degree to which undesirable species are expected to invade and grow when openings are made in the tree canopy. The main factors that affect plant competition are the depth to the water table and the available water capacity. A rating of *slight* indicates that competition from undesirable plants is not likely to prevent natural regeneration or suppress the more desirable species. Planted seedlings can become established without undue competition. A rating of *moderate* indicates that competition may delay the establishment of desirable species. Competition may hamper stand development, but it will not prevent the eventual development of fully stocked stands. A rating of *severe* indicates that competition can be expected to prevent regeneration unless precautionary measures are applied.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index* and as a *productivity class*. Yields are predicted at the point where the mean annual increment culminates. The productivity of the soils in this survey area generally is based on 30 years for eastern cottonwood, 35 years for American sycamore, and 50 years for all other species *(8, 9, 10, 11, 12, 31)*.

The *site index* is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or

improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

The *productivity class*, a number, is the yield likely to be produced by the most important trees. This number, expressed as cubic meters per hectare per year, indicates the amount of fiber produced on a fully stocked, even-aged, unmanaged stand. Cubic meters per hectare can be converted to cubic feet per acre by multiplying by 14.3. It can be converted to board feet by multiplying by a factor of about 71. For example, a productivity class of 8 means that the soil can be expected to produce, at the point where the mean annual increment culminates, 114 cubic feet per acre per year and about 568 board feet per acre per year.

The first species listed under *common trees* for a soil is the indicator species for that soil. It is the dominant species on the soil and the one that determines the ordination class.

Trees to plant are those that are suitable for commercial wood production. They are used for reforestation or, under suitable conditions, for natural regeneration. The desired product, topographic position (such as a low, wet area), and personal preference are three factors among many that can influence the choice of trees for reforestation.

Woodland Resources

The vegetation in La Salle Parish includes pine woodland in the northern and central parts and bottom land hardwoods in the southern part and in areas along the Little River in the western part. The dominant forest species are longleaf pine, slash pine, and loblolly pine on the higher sites in the uplands; sweetgum, red oak, white oak, elm, pecan, green ash, willow, and sycamore on the bottom land; and baldcypress and water tupelo in the swamps.

La Salle Parish was once a vast virgin forest of pine in the northern part and oak, gum, and cypress in the southern part and along the Little River. No large areas of the virgin forest remain. The only small tract of virgin pine left in the parish is in an area near Urania. Most of the virgin forest was cut around the turn of the century. The timber barons of that time stripped the uplands of commercially valuable pine and the bottom land of oak, gum, and cypress. These trees fueled the large sawmills located at Trout, Urania, and other areas.

Very few attempts at artificial regeneration were made at the time, and the second-growth forests were strictly a product of nature. One notable exception was a forest near Urania that was regenerated under the guidance of Henry Hardtner. The second-growth forests were largely unmanaged and were subject to periodic wildfires and clearcutting. Little or no thought was given to selective cutting or regeneration.

This type of mismanagement continued until the late 1940's and early 1950's. At that time, a series of events set the stage for forest management and reforestation. First, effective fire protection was provided by the Louisiana Office of Forestry (then known as the Louisiana Forestry Commission). Second, the Office of Forestry made pine seedlings more readily available for planting in cutover areas. Third, timber and land values began to increase, thus providing an incentive for landowners to bring their woodland into production. Currently, most of the wooded areas on uplands in La Salle Parish are once again producing commercial timber.

About 360,000 acres in La Salle Parish is commercial woodland *(37)*. Commercial woodland is defined as land that produces or is capable of producing crops of industrial wood. An additional 12,636 acres is in forests on public and private land that is used mainly for recreation and as habitat for wildlife.

The acreage of commercial woodland in the parish decreased by about 14,300 acres between 1964 and 1974. Most of the cleared land was converted to cropland or pasture. A smaller acreage was converted to urban land or transmission and transportation corridors. During the period 1974 to 1984, the acreage of woodland increased from 357,500 to 360,000 acres. This increase occurred mainly as a result of the reversion of marginal cropland and pasture to woodland. The extent of woodland in the parish will probably stabilize at the present acreage.

About 15.6 percent of the commercial woodland in La Salle Parish is public land. About 78.1 percent is owned by the forest industry and 6.3 percent by private farms. The public land consists of 5,308 acres in the Catahoula National Wildlife Refuge and 60,275 acres in the Saline Wildlife Management Area.

The parish is in two major land resource areas (MLRA's)—the Western Coastal Plain and Southern Mississippi Valley Alluvium. Most of the commercial forest is on the Western Coastal Plain.

The dominant trees on the Western Coastal Plain are loblolly pine, slash pine, sweetgum, shortleaf pine, longleaf pine, southern red oak, white oak, water oak, post oak, black cherry, elm, and red maple. Those in the Southern Mississippi Valley Alluvium MLRA are ash, cottonwood, elm, and sycamore on well drained soils and ash, elm, tupelo gum, baldcypress, water oak, pecan, hackberry, willow oak, and red maple on poorly drained soils.

Commercial forests can be divided into forest types on the basis of tree species, site quality, or age *(37)*. As used in this survey, forest types are stands of trees of similar character, made up of the same species, and growing under the same ecological and biological

Figure 8.—An even-aged stand of loblolly pine in an area of Ruston fine sandy loam, 1 to 3 percent slopes.

conditions. The forest types are named for the dominant trees.

The *oak-gum-cypress* forest type makes up about 28 percent of the woodland in the parish. This type occurs as bottom land forests of tupelo gum, blackgum, sweetgum, oak, and baldcypress, singly or in combination. Associated trees include cottonwood, black willow, ash, hackberry, maple, and elm.

The *loblolly-shortleaf pine* forest type makes up about 42 percent of the woodland in the parish. Loblolly pine is dominant in most areas (fig. 8), except for the drier sites. Scattered hardwoods, such as sweetgum, blackgum, southern red oak, post oak, white oak, mockernut hickory, and pignut hickory, may be mixed with the pines on well drained soils. On the more moist sites, sweetgum, red maple, water oak, and willow oak may be mixed with the pines. Ash and American beech are associated with this forest type on the fertile, well drained soils in coves and along stream bottoms.

The *oak-hickory* forest type makes up about 15 percent of the woodland in the parish. Most of the stocking is upland oaks or hickory, singly or in combination. Where pines make up 25 to 50 percent of the stocking, the stand is classified as oak-pine. The most common associated trees are elm and maple.

The *longleaf-slash pine* forest type makes up about 2 percent of the woodland in the parish. About 50 percent or more of the stand is longleaf pine or slash pine, singly or in combination. The most common associated trees are other southern pines, oak, and gum.

The *oak-pine* forest type makes up about 11 percent of the woodland in the parish. About 50 to 75 percent of

the stocking is hardwoods, generally upland oaks, and 25 to 50 percent is softwoods other than cypress. The species composition is primarily the result of the kinds of soil and the slope. On the higher, drier sites, the hardwoods tend to be upland oaks, such as post oak, southern red oak, and blackjack oak. On the more moist, more fertile sites, they are white oak, southern red oak, and blackjack oak. Blackgum, winged elm, red maple, and various hickories are associated with the oak-pine type on both the drier and the more moist sites.

By physiographic site, or the availability of moisture for tree growth, the woodland in the parish is about 69 percent mesic, 20 percent hydric, and 11 percent xeric. A xeric site is one that has a low or deficient amount of moisture. A mesic site is one that has a moderate amount of moisture. A hydric site is one that has an abundant or an overly abundant amount of moisture.

The volume of marketable timber in the parish is about 61 percent pine and 39 percent hardwoods. About 53 percent of the commercial woodland is used for sawtimber, 26 percent supports saplings and seedlings, and 20 percent is used for poletimber. The rest of the woodland is classified as nonstocked *(37)*.

The productivity of woodland can be measured by the cubic feet of wood produced per acre per year. Most of the more productive sites in La Salle Parish are used as pasture or cropland. Consequently, only 5 percent of the woodland produces 165 cubic feet or more of wood per acre. About 9 percent produces 120 to 165 cubic feet per acre, 34 percent produces 85 to 120 cubic feet per acre, 45 percent produces 50 to 85 cubic feet per acre, and 7 percent produces less than 50 cubic feet per acre.

Timber production is an important part of the economy in the parish. Most of the upland pine sites and the hardwood forests on bottom land are privately owned. These tracts are producing well below their potential. They can be improved by thinning out mature trees and undesirable species. Protection from grazing, fire, insects, and diseases and tree planting and timber stand improvement are needed. The woodland owned by the forest industry generally is well managed.

The Soil Conservation Service, the Louisiana Office of Forestry, or the Louisiana Cooperative Extension Service can help to determine specific management needs.

Environmental Impact

The values associated with woodland include wildlife habitat, recreation, natural beauty, and conservation of soil and water. The commercial woodland in the parish provides food and shelter for wildlife and offers many opportunities for recreation. Several hunting and fishing clubs in the parish either lease or otherwise use the woodland. The woodland provides watershed protection, helps to control erosion and sedimentation, and enhances the quality and value of water resources.

Trees can be planted to screen distracting views of dumps and other unsightly areas, muffle the sound of traffic, reduce the velocity of winds, and enhance the beauty of the landscape. Trees and forests help to filter out airborne dust and other impurities, convert carbon dioxide into life-giving oxygen, and provide shade.

Production of Forage on Woodland

The kind and amount of understory vegetation that can be produced in an area are related to the soils, the climate, and the extent of the overstory. Grazing is not recommended in areas of hardwoods. In many areas of pine woodland, however, grazing by cattle can be a compatible secondary use. Grasses, legumes, forbs, and many woody browse species in the understory can be grazed, but the grazing should be managed so that i supplements the woodland enterprise without damaging the wood crop. In most areas of pine woodland, grazing is beneficial to the woodland program because it reduces the extent of heavy "rough," thus reducing the hazard of wildfires. Also, grazing helps to remove undesirable woody plants.

The success of a combined woodland and livestock program depends primarily on the intensity and time of grazing. The proper intensity of grazing helps to maintain a protective plant cover and maintains or improves the quantity and quality of trees and forage vegetation.

Forage production varies, depending to the type of woodland and the amount of sunlight that reaches the understory vegetation during the growing season. Soils that have about the same potential for producing trees also have similar potential for producing about the same kind and amount of understory vegetation. The plant community on these soils can reproduce itself as long as the environment does not change.

Research has established that there is a close correlation between the total potential yield of grasses, legumes, and forbs and the amount of sunlight reaching the ground at midday in the forest. Herbage production declines as the forest canopy becomes denser.

One of the main management objectives is to keep the woodland forage in excellent or good condition. If this objective is met, water is conserved, yields are improved, and the soils are protected.

Recreation

The soils of the survey area are rated in table 8 according to limitations that affect their suitability for

recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 8, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 8 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 11 and interpretations for dwellings without basements and for local roads and streets in table 10.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have gentle slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes, stones, or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

By Billy R. Craft, biologist, Soil Conservation Service, helped prepare this section.

La Salle Parish is largely a rural area. It provides good habitat, dominantly for woodland wildlife. About 360,000 acres, or 89 percent of the land in the parish, is forested. The rest of the parish is pasture, cropland, or wetland or is developed for urban or other uses.

Several plant communities provide a good diversity in wildlife habitat types in the parish. Some of the most productive wildlife habitat is in the southern part of the parish. The alluvial soils in this area support a bottom land hardwood plant community made up dominantly of Nuttall oak, overcup oak, water hickory, willow oak, persimmon, and sugarberry. This habitat type supports a variety of wildlife species, including white-tailed deer, squirrel, swamp rabbit, wild turkey, beaver, mink, raccoon, fox, coyote, wood duck, and many nongame species. One of the primary limiting factors in this wooded area is the abundance of hogs and cattle, which compete with the wildlife for food and reduce the quality of cover for wildlife. Competition from livestock also is a problem in other parts of the parish.

The narrow stream bottoms that drain the uplands also provide high-quality wildlife habitat. About 48,000 acres in the parish is in these stream bottoms. The typical overstory trees in these areas include water oak, cherrybark red oak, white oak, shagbark hickory, elm, magnolia, and beech. Some of the best areas for hunting squirrel, deer, and turkey are along the upland creeks. Special efforts are needed to maintain the habitat in these areas.

The soils in the uplands are managed primarily for the production of pine timber. Wildlife habitat is a

Figure 9.—Lehman Lake, one of several large lakes in the parish that provide habitat for fish and food and resting areas for waterfowl and other wetland wildlife.

secondary management objective in most of these areas. Interest in leasing land for wildlife purposes, however, is increasing. Hunting clubs are numerous. Private landowners can earn income by leasing their woodlands to these clubs. Most of the upland forests support loblolly pine, shortleaf pine, longleaf pine, or mixed pines and hardwoods.

About 18,800 acres in the parish is open agricultural land, which provides poor or fair habitat for bobwhite quail, mourning dove, cottontail and swamp rabbits, and other species. The main limitations affecting wildlife habitat are a lack of diversity in the plant community and a scarcity of fall and winter cover. Grasses in pastured areas include bahiagrass, common bermudagrass, carpetgrass, Dallisgrass, and miscellaneous native species. The main crops in the areas of cropland are soybeans, rice, cotton, grain sorghum, and winter wheat.

The many lakes, rivers, creeks, and private ponds in the parish have low to high populations of fish. The fish species include largemouth bass, white bass, bluegill, green sunfish, white and black crappie, redear, bowfin, buffalo, gar, shad, carp, and various shiners. Farm ponds, the Little River, Castar Creek, Bayou Funny Louis, Lehman Lake, Saline Lake, and Catahoula Lake are the main bodies of water in the parish that support fish (fig. 9).

La Salle Parish provides habitat for endangered, threatened, or unique species. Examples are bald eagle, red-cockaded woodpecker, alligator, golden eagle, and possibly southern panther.

Catahoula Lake, in the southern part of the parish, is

a large, shallow sump area characterized by widely fluctuating seasonal water levels. It is about 14 miles long and 3 miles wide and includes about 20,000 acres of open lakebed. During periods when the water level is high, the lake is as large as 30,000 acres. It is a high-value, natural wintering area for waterfowl. It is an important wetland area for migratory waterfowl and a significant public waterfowl hunting area for central Louisiana residents.

The Catahoula National Wildlife Refuge is about 10 miles south of Jena. The refuge is made up of 5,308 acres. It borders the northeastern shore of Catahoula Lake. It is managed as winter habitat for migratory waterfowl according to the overall objectives of the Mississippi Flyway, which are to provide optimum habitat and protection for threatened and endangered species, to preserve bottom land hardwoods, to provide habitat for a diversity of wildlife, and to provide opportunities for environmental education, interpretation, and wildlife-oriented recreation.

The state-owned Saline Wildlife Management Area is 60,276 acres of bottom land hardwoods. A total of 48,936 acres of this area is in the southeastern part of La Salle Parish. This area is one of the last remaining large tracts of bottom land hardwoods in the United States. It offers excellent opportunities for hunting forest game species, especially white-tailed deer.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 9, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, rice, and grain sorghum.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, common bermudagrass, bahiagrass, clover, and vetch.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, crabgrass, and woolly croton.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, sugarberry, black cherry, sweetgum, persimmon, hawthorn, dogwood, hickory, blackberry, and huckleberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian olive, blueberry, and mayhaw.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, cedar, and baldcypress.

Shrubs are bushy woody plants that produce fruit, buds, twigs, bark, and foliage. Soil properties and features that affect the growth of shrubs are depth of

the root zone, available water capacity, and soil moisture. Examples of shrubs are American beautyberry, waxmyrtle, American elder, yaupon, and Allegany chinkapin.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, and slope. Examples of wetland plants are smartweed, wild millet, wildrice, saltgrass, cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, mourning dove, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, deer, and coyote.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, nutria, and beaver.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations need to be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreation uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 10 shows the degree and kind of soil limitations that affect shallow excavations, dwellings

without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock or a very firm, dense layer; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, and shrink-swell potential can cause the movement of footings. A high water table, depth to bedrock, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock, a high water table, flooding, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock, the available water capacity in the upper 40 inches, and the content of salts and sodium affect plant growth. Flooding, wetness, slope, rock outcrops, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 11 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 11 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock, and flooding affect absorption of the effluent. Bedrock interferes with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material

beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 11 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock, flooding, and content of organic matter.

Excessive seepage resulting from rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope and bedrock can cause construction problems.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 11 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock, a high water table, slope, and flooding affect both types of landfill. Texture, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 12 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by a high water table and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand

or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential or slopes of 15 to 25 percent. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, or slopes of more than 25 percent. They are wet, and depth to the water table is less than 1 foot. These soils may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 12, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, soil reaction, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, and rock fragments.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They have little or no gravel and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils generally is preferred for topsoil because of its content of organic matter. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 13 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment.

Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of organic matter or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock or to other layers that affect the rate of water movement, permeability, depth to a high water table or depth of standing water if the soil is subject to ponding, slope, and susceptibility to flooding. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by sodium or other toxic substances in the root zone. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by the depth to bedrock. The performance of a system is affected by the depth of the root zone, the amount of sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, and depth to bedrock affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Wetness, slope, and depth to bedrock affect the construction of grassed waterways. A low available water capacity, restricted rooting depth, toxic substances such as sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 14 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as about 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system *(3)* and the system adopted by the American Association of State Highway and Transportation Officials *(2)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard

Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 15 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at ⅓ bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE)

to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 15, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 16 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, nor is water in swamps and marshes.

Table 16 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is near 0 percent to 5 percent in any year); *occasional* that it occurs, on the average, once or less in 2 years (the chance of flooding is 5 to 50 percent in any year); and *frequent* that it occurs, on the average, more than once in 2 years (the chance of flooding is more than 50 percent in any year). Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 days to 1 month, and *very long* if more than 1 month. Probable dates are expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 16 are the depth to the seasonal high water table; the kind of water table—that is, perched or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 16.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is

allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low, moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low, moderate,* or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Soil Fertility Levels

Dr. M.C. Amacher and Dr. R.J. Miller, Department of Agronomy, Louisiana State University, prepared this section.

This section gives information concerning the environmental factors and physical and chemical properties that affect the potential of soils for crop production. It also lists the methods used to obtain the chemical analyses of the soils sampled.

Crop composition and yields are a function of many soil, plant, and environmental factors. The environmental factors include light (intensity and duration), temperature of the air and soil, precipitation (distribution and amount), and atmospheric carbon dioxide concentration.

Plant factors are species and hybrid specific. They include the rate of nutrient and water uptake and the rate of plant growth and related plant functions.

Soil factors consist of both physical and chemical properties. The physical properties include particle-size distribution, texture, structure, surface area, bulk density, water retention and flow, and aeration. The chemical properties can be separated into quantity factors, intensity factors, relative intensity factors, quantity-intensity relationship factors, and replenishment factors.

The *quantity factor* refers to the amount of an element in the soil that is readily available for uptake by plants. When the quantity factor is ascertained, the available supply of an element is removed from the soil by a suitable extractant and is analyzed.

The *intensity factor* refers to the concentration of an element species in the soil water. It is a measure of the availability of an element for uptake by plant roots. The availability of an element to plants differs in two soils that have identical available quantities of the element but have different intensity factors.

The *relative intensity factor* refers to the effect that the availability of one element has on the availability of another element.

The *quantity-intensity relationship factor* refers to the reactions between the soil surface and soil water that control the distribution of element species between the available supply in the soil and the soil water. A special quantity-intensity relationship is the buffer capacity of the soil for a given element. The buffer capacity is the amount of a given element that must be added to or removed from the available supply to produce a given change in the intensity factor for that element.

The *replenishment factor* refers to the rate of replenishment of the available supply and intensity factors by weathering reactions, additions of fertilizer, and transport by mass flow and diffusion.

These soil factors are interdependent. The magnitude of the factors and the interactions among them control crop response. The relative importance of each factor changes from soil to soil, crop to crop, and environment to environment. The soil factors are only part of the overall system.

The goal of soil testing is to provide information for a soil and crop management program that establishes and maintains the optimum levels and proportions of the essential elements in the soil for crop and animal nutrition and protects the environment against the buildup of potentially toxic levels of essential and nonessential elements. Current soil tests measure only one soil factor—the available supply of nutrients in the surface layer or plow layer. Where crop production is clearly limited by the available supply of one or more nutrients in the plow layer, existing soil tests generally can diagnose the problem and reliable recommendations to correct the deficiency can be made. Soil management systems generally are based on physical and chemical alterations of the plow layer.

The characteristics of this layer can vary from one location to another, depending on management practices and land use.

The underlying layers are less likely to change or change very slowly as a result of alteration of the plow layer. The properties of the subsoil reflect the inherent ability of the soil to supply nutrients to plant roots and to provide a favorable environment for root growth. If soil fertility recommendations based on current soil tests are followed, major fertility deficiencies in the plow layer are normally corrected. Crop production is then limited by crop and environmental factors, the physical properties of the plow layer, and the physical and chemical properties of the subsoil.

The supply of available nutrients in the soil is an important factor affecting crop production. Information about the supply of available nutrients in the subsoil can be used as the basis for an evaluation of the natural fertility level of the soil.

Soils were sampled during the soil survey and analyzed for reaction; organic matter content; extractable phosphorus; exchangeable cations of calcium, magnesium, potassium, sodium, aluminum, and hydrogen; total acidity; and cation-exchange capacity. The results are summarized in table 17. The methods used in obtaining the data are indicated in the list that follows. The codes in parentheses refer to published methods *(41)*. More detailed information about chemical analyses of soils is available *(1, 7, 24, 28, 30, 32, 35, 36, 43)*.

Reaction (pH)—1:1 soil/water solution (8C1a).
Organic carbon—acid-dichromate oxidation (6A1a).
Extractable phosphorus—Bray 2 extractant (0.03 molar ammonium fluoride-0.1 molar hydrochloric acid).
Exchangeable cations—pH 7, 1 molar ammonium acetate, calcium (6N2), magnesium (6O2), potassium (6Q2), sodium (6P2).
Exchangeable aluminum and hydrogen—1 molar potassium chloride (6G2).
Total acidity—pH 8.2, barium chloride-triethanolamine (6H1a).
Effective cation-exchange capacity—sum of bases plus exchangeable aluminum and hydrogen (5A3b).
Sum cation-exchange capacity—sum of bases plus total acidity (5A3a).
Base saturation—sum of bases/sum cation-exchange capacity (5C3).
Exchangeable sodium percentage—exchangeable sodium/sum cation-exchange capacity.
Aluminum saturation—exchangeable aluminum/effective cation-exchange capacity.

In general, four major types of nutrient distribution can be distinguished in the soil profiles in La Salle Parish. The first type includes soils having a relatively high level of available nutrients throughout. This type reflects the relatively high fertility status of the material in which the soils formed and a relatively young age or limited weathering in the soil profile.

The second type includes soils in which the level of available nutrients is relatively low in the surface layer but generally increases with increasing depth. These soils have relatively fertile parent material and are older than the first type and have been subject to weathering over a longer period or to more intense weathering. Crops on these soils can exhibit deficiency symptoms early in the growing season if the level of available nutrients in the surface layer is low enough. If the crop roots are able to penetrate to the more fertile subsoil as the growing season progresses, the deficiency symptoms often disappear.

The third type includes soils that have an adequate or relatively high level of available nutrients in the surface layer but have a relatively low level in the subsoil. Such soils formed in material that is low in fertility or are older soils that have been subject to more intense weathering over a longer period. The higher nutrient levels in the surface layer generally are a result of the addition of fertilizer to agricultural soils or biocycling in undisturbed soils.

The fourth type includes soils that have a relatively low level of available nutrients throughout. These soils formed in material that is low in fertility or are older soils that have been subject to intense weathering over a long period. They have not accumulated nutrients in the surface layer as a result of the addition of fertilizer or biocycling.

Soil properties, such as reaction, content of organic matter, content of sodium, and cation-exchange capacity, can also show the general distribution patterns described in the previous paragraphs. These patterns are a result of the interactions of parent material, weathering (climate), time, and to a lesser extent organisms and topography.

Nitrogen.—Generally, more than 90 percent of the nitrogen in the surface layer is organic. Most of the nitrogen in the subsoil commonly is fixed ammonium nitrogen. These forms of nitrogen are unavailable for plant uptake, but they can be converted to readily available ammonium and nitrate species.

Nitrogen is generally the most limiting nutrient element affecting crop production because plants have a high demand for it. Because reliable nitrogen soil tests are not available, nitrogen fertilizer recommendations are nearly always based on the nitrogen requirement of the crop rather than on nitrogen soil test levels.

Despite the lack of adequate nitrogen soil tests, the

amounts of readily available ammonium and nitrate nitrogen in soils, the amount of organic nitrogen, the rate of mineralization of organic nitrogen to available forms, and the rate of conversion of fixed ammonium nitrogen to available forms can indicate the fertility status of a soil with respect to nitrogen. Because the amounts and rates of transformation of the various forms of nitrogen in the soils of La Salle Parish are unknown, no assessment of the nitrogen fertility status of these soils can be made.

Phosphorus.—Phosphorus occurs in soils as discrete solid phase minerals, such as hydroxyapatite, variscite, and strengite; as occluded or coprecipitated phosphorus in other minerals; as retained phosphorus on mineral surfaces, such as carbonates, metal oxides, and layer silicates; and in organic compounds. Most of the phosphorus in soils is unavailable for plant uptake.

The Bray 2 extractant tends to extract more phosphorus than the more commonly used Bray 1, Mehlich I, and Olsen extractants. The Bray 2 extractant provides an estimate of the supply of phosphorus available to plants. According to the soil test interpretation guidelines used in Louisiana, the Bray 2 extractable phosphorus content of most of the soils on uplands in La Salle Parish, such as Ruston, Smithdale, Pheba, Savannah, Malbis, Keithville, Gore, Kisatchie, Oula, Sacul, Bayoudan, Hollywood, and Kurth soils, is low or very low. Furthermore, the level of extractable phosphorus is generally low throughout the soils. Only Bayoudan silt loam (sample number S85LA59-15) has a slightly higher level of phosphorus in the subsoil than most other soils in the uplands. The surface layer of some of the soils has a somewhat higher level of extractable phosphorus, which can be attributed to additions of fertilizer or to biocycling. The low or very low levels of available phosphorus limit crop production. The soils require continual additions of phosphorus fertilizer to build up and maintain adequate levels of available phosphorus for sustained crop production.

The soils that formed in loess, such as Lexington, Libuse, and Vick soils, and the soils on low stream terraces, such as Bursley, Deerford, Foley, Forestdale, Bienville, Cahaba, and Zenoria soils, generally have a low level of extractable phosphorus throughout. The soils that formed in loess, however, have a higher level in the lower part, and the soils on low stream terraces have a slightly higher level in the surface layer.

The soils that formed in recent alluvium washed from the uplands, such as Jena and Ouachita soils, have a low level of extractable phosphorus because the alluvial material was eroded from soils in which the level of phosphorus is low. In contrast, soils that formed in Mississippi River alluvium have a low to high level of extractable phosphorus. The level is low, for example, in Alligator soils and high in Dundee soils. In general, the content of extractable phosphorus increases with increasing depth in Dundee, Fausse, Sharkey, and Tensas soils, reflecting a parent material that has a high level of fertility. Additions of phosphorus fertilizer are necessary, however, to maintain crop production because the surface layer may be depleted of phosphorus and plant roots may be unable to penetrate to the more fertile subsoil because of a high water table and poor aeration.

Potassium.—Potassium occurs in three major forms in soils: exchangeable potassium associated with negatively charged sites on clay mineral surfaces, nonexchangeable potassium trapped between clay mineral interlayers, and structural potassium within the crystal lattice of minerals. Exchangeable potassium in soils can be replaced by other cations and generally is readily available for plant uptake. To become available to plants, nonexchangeable potassium and structural potassium must be converted to exchangeable potassium through weathering reactions.

The content of exchangeable potassium in soils is an estimate of the supply of potassium available to plants. According to soil test interpretation guidelines, the available supply of potassium in most of the soils on uplands in the parish is very low, low, or medium, depending on the soil texture. Exchangeable potassium levels are generally low throughout the soils because of a general lack of micaceous minerals, which are a source of exchangeable potassium during weathering.

The content of exchangeable potassium in soils that formed in unconsolidated acid clays, such as Bayoudan soils, generally remains about the same or increases with increasing depth. Increases in content of exchangeable potassium with increasing depth can be associated with an increasing content of clay. The content of exchangeable potassium generally is higher throughout soils that formed in unconsolidated alkaline clays, such as Hollywood soils, than in other soils in the uplands.

The content of exchangeable potassium in soils that formed in loess generally is low or medium, depending on the texture and other soil properties. The potassium generally is distributed uniformly throughout the profile.

The content of exchangeable potassium in soils on low stream terraces and flood plains generally is low or medium, depending on the texture and other soil properties. The soils that formed in Mississippi River alluvium, such as Sharkey soils, have a higher level of exchangeable potassium. The lowest level is in soils that are along narrow streams and that formed in material washed from the uplands.

Crops respond to applications of potassium fertilizer if exchangeable potassium levels are very low or low.

Low levels can be gradually built up by adding potassium fertilizer if the soils contain a sufficient amount of clay to hold the potassium. Exchangeable potassium levels can be maintained by adding enough potassium fertilizer to make up for that removed by crops, the fixation of exchangeable potassium to nonexchangeable potassium, and leaching. Some of the soils in the parish, such as Jena soils, do not have a sufficient amount of clay for the cation-exchange capacity to be high enough to maintain adequate quantities of available potassium for sustained crop production. These soils require more frequent additions of potassium because of leaching.

Magnesium.—Magnesium occurs in soils as exchangeable magnesium associated with negatively charged sites on clay mineral surfaces and as structural magnesium in mineral crystal lattices. Exchangeable magnesium generally is readily available for plant uptake, whereas structural magnesium must be converted to exchangeable magnesium during mineral weathering reactions.

According to soil test interpretation guidelines, the content of exchangeable magnesium in the soils in La Salle Parish is low, medium, or high, depending on the texture. In general, the content in the soils on uplands, such as Gore soils, increases with increasing depth because of an increasing content of clay in the subsoil. In Bayoudan, Hollywood, and other soils, however, the magnesium is distributed uniformly throughout the profile. The content of exchangeable magnesium in Oula and other soils greatly increases from the surface layer to the subsoil. In Smithdale and other soils, the highest level of exchangeable magnesium is in the upper part of the subsoil.

In the soils on low stream terraces and flood plains, the content of exchangeable magnesium generally increases with increasing depth, as in Deerford and Alligator soils, or it remains about the same throughout the profile, as in Forestdale and Fausse soils.

The level of exchangeable magnesium in most of the soils in the parish is more than adequate for crop production, especially where the plant roots can exploit the high level in the subsoil. Magnesium deficiencies in plants are rare. Thus, additions of magnesium fertilizer generally are not needed.

Calcium.—Calcium occurs in soils as exchangeable calcium associated with negatively charged sites on clay mineral surfaces and as structural calcium in mineral crystal lattices. Exchangeable calcium generally is available for plant uptake, whereas structural calcium is not.

According to soil test interpretation guidelines, the exchangeable calcium levels in the soils in La Salle Parish are low, medium, or high, depending on soil texture. Calcium deficiencies in plants are extremely rare. Calcium is normally included with the material added to soils when lime is applied to correct problems associated with acidity.

Calcium is generally the most plentiful exchangeable cation in soils. The subsoil of Ruston, Smithdale, Pheba, Savannah, Lexington, Libuse, Vick, and Oula soils, however, has more exchangeable magnesium than exchangeable calcium. In the other soils in the parish, the exchangeable calcium levels are higher than or about the same as the exchangeable magnesium levels.

As depth increases, the content of exchangeable calcium increases in Bayoudan and other soils, remains about the same in Forestdale and other soils, and decreases in Lexington and other soils. In many soils it is lower in the E horizon than in the upper part of the Bt horizon. A higher level in the subsoil than in the surface layer is generally associated with a higher content of clay or, in Hollywood and other soils that have a high pH level, with free carbonates.

Organic matter.—The organic matter content in a soil greatly influences other soil properties. High organic matter levels in mineral soils are desirable, and low levels can lead to many problems. Increasing the organic matter content can greatly improve soil structure, drainage, and other physical properties. It can also increase the available water capacity, the cation-exchange capacity, and the content of nitrogen.

Increasing the organic matter content is difficult because organic matter is continually subject to microbial degradation, especially in Louisiana, where higher temperatures increase the extent of microbial activity and thus also increase the degradation rate. The rate at which organic matter in native plant communities breaks down is balanced by the rate at which fresh material is added. Disruption of this natural process can lead to a decrease in the organic matter content of the soil. Management practices that cause erosion lead to a further decrease.

Even if no degradation of organic matter occurs, 10 tons of organic matter is needed to raise the organic matter content of the top 6 inches of the soil by just 1 percent. Since breakdown of organic matter does occur in the soil, large amounts must be added for several decades before a small increase in the content can be achieved. Conservation tillage and cover crops slowly increase the organic matter content over time or at least prevent further declines.

The organic matter content in most of the soils in the parish is low. It decreases sharply with increasing depth because additions of fresh organic matter are confined to the surface layer. The low levels reflect a high rate of organic matter degradation, erosion, and cultural

practices that make maintenance of a higher content of organic matter difficult.

Sodium.—Sodium occurs in soils as exchangeable sodium associated with negatively charged sites on clay mineral surfaces and as structural sodium in mineral crystal lattices. Because primary sodium minerals are readily soluble and are generally not strongly retained by soils, well drained soils that are subject to a moderate or more intense degree of weathering from rainfall do not normally contain significant amounts of sodium. Soils in low rainfall environments, soils in which drainage is restricted in the subsoil, and coastal marsh soils contain significant amounts of sodium. High levels of exchangeable sodium are associated with undesirable physical properties, such as poor structure, slow permeability, and restricted drainage.

Although many of the soils in the parish contain more exchangeable sodium than exchangeable potassium, only the Deerford and Foley soils have excessive levels of exchangeable sodium in the root zone. Elevated levels of exchangeable sodium are below the surface layer in some soils, such as Pheba soils.

pH, exchangeable aluminum and hydrogen, and exchangeable and total acidity.—The pH of the soil solution in contact with the soil affects other soil properties. Soil pH is an intensity factor rather than a quantity factor. The lower the pH, the more acidic the soil. Soil pH controls the availability of essential and nonessential elements for plant uptake by controlling mineral solubility, ion exchange, and adsorption and desorption reactions with soil surfaces. Soil pH also affects microbial activity.

Aluminum occurs in soils as exchangeable monomeric hydrolysis species, nonexchangeable polymeric hydrolysis species, aluminum oxides, and aluminosilicate minerals. Exchangeable aluminum in soils is determined by extraction with neutral salts, such as potassium chloride and barium chloride. The exchangeable aluminum in soils is directly related to pH. If pH is less than 5.5, the soils have significant amounts of exchangeable aluminum that has a charge of plus 3. This amount of aluminum is toxic to plants. The toxic effects of aluminum on plants can be alleviated by adding lime to convert exchangeable aluminum to nonexchangeable polymeric hydrolysis species. High levels of organic matter can also alleviate aluminum toxicity by complexing the aluminum.

Sources of exchangeable hydrogen in soils include hydrolysis of exchangeable and nonexchangeable aluminum and pH-dependent exchange sites on metal oxides, certain layer silicates, and organic matter. As determined by extraction with neutral salts, such as potassium chlorides, exchangeable hydrogen generally is not a major component of soil acidity because the hydrogen is not readily replaced by other cations unless accompanied by a neutralized reaction. Most of the neutral salt exchangeable hydrogen in soils apparently results from aluminum hydrolysis.

Acidity from hydrolysis of neutral salt exchangeable aluminum plus neutral salt exchangeable hydrogen from pH-dependent exchange sites makes up the exchangeable acidity in soils. Exchangeable acidity is determined by the pH of the soil. Titratable acidity is the amount of acidity neutralized to a selected pH, generally 7 or 8.2, and constitutes the total potential acidity of a soil determined up to a given pH. All sources of soil acidity, including hydrolysis of monomeric and polymeric aluminum species and hydrogen from pH-dependent exchange sites on metal oxides, layer silicates, and organic matter, contribute to the total potential acidity. Total potential acidity in soils is ascertained by titration with bases or incubation with lime; extraction with a buffered extractant followed by titration of the buffered extractant (pH 8.2, barium chloride-triethanolamine method); or equilibration with buffers followed by estimation of acidity from changes in buffer pH.

Most of the soils of the parish have a low pH, significant quantities of exchangeable aluminum, and high levels of total acidity in many horizons. Only the soils that formed in Mississippi River alluvium or in alkaline clays have low levels of exchangeable aluminum. In many of the soils, the exchangeable aluminum levels are high enough to limit crop production. Examples are Bayoudan, Cahaba, Gore, Keithville, Kurth, Malbis, and Pheba soils. Deerford and Foley soils are very acid and have high levels of exchangeable aluminum in the surface layer, but the pH sharply increases and the level of exchangeable aluminum decreases with increasing depth.

High levels of exchangeable aluminum in the surface layer can be reduced by liming, but no economical methods are available to neutralize soil acidity below the surface layer. Exchangeable aluminum levels can be reduced somewhat by applying gypsum so that the calcium leaches through the soil profile and replaces the exchangeable aluminum.

Cation-exchange capacity.—The cation-exchange capacity represents the available supply of nutrient and nonnutrient cations in the soil. It is the amount of cations on permanent and pH-dependent, negatively charged sites on soil surfaces. Permanent-charge cation-exchange sites occur because a net negative charge develops on a mineral surface from substitution of ions within the crystal lattice. A negative charge develops from ionization of surface hydroxyl groups on [illegible]als. Organic matter also produces pH-dependent cation-exchange sites.

Methods for determining cation-exchange capacity use buffered or unbuffered salts to measure the cation-exchange capacity at a specified pH. These methods produce different results because the method that uses unbuffered salts includes only part of the pH-dependent cation-exchange capacity and the method that uses buffered salts includes all of the pH-dependent cation-exchange capacity up to the pH of the buffer (generally 7 or 8.2). Errors in the saturation, washing, and replacement steps can also cause different results.

The effective cation-exchange capacity is the sum of exchangeable bases (calcium, magnesium, potassium, and sodium) determined by extraction with pH 7, 1 molar ammonium acetate plus the sum of neutral salt exchangeable aluminum and hydrogen (exchangeable acidity). The sum cation-exchange capacity is the sum of exchangeable bases plus the total acidity determined by extraction with pH 8.2, barium chloride-triethanolamine. The effective cation-exchange capacity generally is less than the sum cation-exchange capacity and includes only that part of the pH-dependent cation-exchange capacity that is determined by exchange of hydrogen with a neutral salt. The sum includes all of the pH-dependent cation-exchange capacity up to pH 8.2. If a soil contains no pH-dependent exchange sites or the pH of the soil is about 8.2, then the effective cation-exchange capacity and the sum cation-exchange capacity are about the same. The larger the cation-exchange capacity, the greater the capacity to store nutrient cations.

The pH-dependent charge is a significant source of the cation-exchange capacity in many of the soils in the parish. Exceptions are the lighter textured soils in which the total acidity is low and soils that have a high content of clay. In these soils permanent-charge cation-exchange capacity is dominant. Because the pH-dependent cation-exchange capacity will increase with pH, the cation-exchange capacity of many of the soils in the parish can be increased by liming. Applications of lime would result in a greater storage capacity for nutrient cations, such as potassium, magnesium, and calcium.

Physical and Chemical Analyses and Mineralogy of Selected Soils

The results of physical analysis of several typical pedons in the survey area are given in table 18 and the results of chemical analysis in table 19. Mineralogy data are given in table 20. The data are for soils sampled at carefully selected sites. Soil samples were analyzed by the Soil Survey Investigations Staff, Soil Conservation Service, and the Soil Characterization Laboratory, Louisiana Agricultural Experiment Station.

Most determinations, except those for grain-size analysis and bulk density, were made on soil material smaller than 2 millimeters in diameter. Measurements reported as percent or quantity of unit weight were calculated on an ovendry basis. The methods used in obtaining the data are indicated in the list that follows. The codes in parentheses refer to published methods *(41)*.

Sand—(0.05-2.0 mm fraction) weight percentages of materials less than 2 mm (3A1).

Silt—(0.002-0.05 mm fraction) pipette extraction, weight percentages of all materials less than 2 mm (3A1).

Clay—(fraction less than 0.002 mm) pipette extraction, weight percentages of materials less than 2 mm (3A1).

Water retained—pressure extraction, percentage of ovendry weight of less than 2 mm material; 1/3 or 1/10 (3/10) bar (4B1), 15 bars (4B2).

Water-retention difference—between 1/3 bar and 15 bars for less than 2 mm material (4C1).

Moist bulk density—of less than 2 mm material, saran-coated clods at field moist (4A3a), air-dry (4A1b), and ovendry (4A1h).

Organic carbon—dichromate, ferric sulfate titration (6A1a).

Extractable cations—ammonium acetate pH 7.0, uncorrected; calcium (6N2), magnesium (6O2), sodium (6P2), potassium (6Q2).

Extractable acidity—barium chloride-triethanolamine (6G2b).

Cation-exchange capacity—ammonium acetate, pH 7.0 (5A1b).

Cation-exchange capacity—sum of cations (5A3a).

Base saturation—ammonium acetate, pH 7.0 (5C1).

Base saturation—sum of cations, TEA, pH 8.2 (5C3).

Reaction (pH)—1:1 water dilution (8C1a).

Reaction (pH)—potassium chloride (8C1c).

Reaction (pH)—calcium chloride (8C1e).

Aluminum and hydrogen—potassium chloride extraction (6G2).

Iron—dithionate-citrate extract (6C1).

Available phosphorus—Bray 1 and 2.

Percent aluminum saturation—calculated on the basis of ammonium acetate extractable Ca, Mg, K, and Na plus 1 N KCl extractable Al and H (5G1).

Cation-exchange capacity to clay ratio—calculated on the basis of CEC by ammonium acetate.

Ratio of water retained at 15 bars to content of clay—a calculated value.

Mineral composition of the clay-sized fraction—determined by x-ray diffraction (7A2b) and differential thermal (7A3) techniques.

Mineral composition of the fraction coarser than clay—determined by optical microscopy (7B1A).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(40)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 21 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Entisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquent (*Aqu*, meaning water, plus *ent*, from Entisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Fluvaquents (*Fluv*, meaning river, plus *aquent*, the suborder of the Entisols that formed in sediments recently deposited by water).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Fluvaquents.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is very fine, montmorillonitic, nonacid, thermic Typic Fluvaquents.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the *Soil Survey Manual (39)*. Many of the technical terms used in the descriptions are defined in *Soil Taxonomy (40)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Alligator Series

The Alligator series consists of poorly drained, very slowly permeable soils that formed in clayey alluvium. These soils are in low positions and on broad flats on

flood plains. They are subject to flooding unless protected by levees. Slopes are generally less than 1 percent.

The soils of the Alligator series are very fine, montmorillonitic, acid, thermic Vertic Haplaquepts.

Alligator soils are similar to Una soils and commonly are near Dundee, Fausse, Sharkey, and Tensas soils. Dundee soils are in high positions on natural levees. They are loamy throughout. Fausse soils are in depressions and remain wet throughout the year. Sharkey soils are in landscape positions similar to those of the Alligator soils. They are less acid in the subsoil than the Alligator soils. Tensas soils are slightly higher on the landscape than the Alligator soils. They have loamy layers at a depth of 20 to 36 inches. Una soils are on alluvial plains of drainage systems other than those in areas of the Alligator soils. They have a fine textured control section.

Typical pedon of Alligator clay, occasionally flooded; about 6 miles southeast of Jena on Highway 84, about 0.8 mile west on Highway 460, about 1.3 miles south on farm road, 0.2 mile southeast along drainageway, 100 feet south of bend in drainageway; SW¼NW¼ sec. 10, T. 7 N., R. 4 E.

Ap—0 to 5 inches; dark grayish brown (10YR 4/2) clay; many fine distinct dark yellowish brown (10YR 4/4, 4/6) mottles; weak medium granular structure and some weak medium subangular blocky structure that parts to weak medium granular; very firm, very sticky and plastic; common fine and very fine roots; very strongly acid; abrupt smooth boundary.

Bg1—5 to 14 inches; gray (5Y 5/1) clay; many fine distinct yellowish brown (10YR 5/6) and common fine distinct dark yellowish brown (10YR 4/4) mottles; moderate medium subangular and angular blocky structure; very firm, sticky and plastic; common fine slickensides that do not intersect; common fine and very fine roots; some material from the Ap horizon in cracks; few fine soft and hard black nodules of iron and manganese oxide; very strongly acid; gradual wavy boundary.

Bg2—14 to 33 inches; gray (5Y 5/1) clay; common fine distinct dark yellowish brown (10YR 4/4) and few fine prominent strong brown (7.5YR 5/6) mottles; moderate fine and medium angular blocky structure; very firm, sticky and very plastic; common medium slickensides that do not intersect; few fine and very fine roots; some material from the upper horizons in cracks; few fine black nodules of iron and manganese oxide; strongly acid; gradual wavy boundary.

Bg3—33 to 60 inches; gray (10YR 5/1) clay; many fine and medium prominent strong brown (7.5YR 5/6) and common fine distinct dark yellowish brown (10YR 4/4) mottles; weak coarse and medium angular blocky structure; common medium and coarse slickensides that do not intersect; very firm, very plastic; few fine roots; common fine masses of white salt crystals; few fine soft and hard black nodules of iron and manganese oxide; very strongly acid.

The thickness of the solum ranges from 40 to 60 inches. Except for the surface layer in areas that have been limed, reaction in the upper 40 inches is very strongly acid or strongly acid.

The A horizon has hue of 10YR or 5Y, value of 4 to 6, and chroma of 1 or 2. It is 4 to 10 inches thick.

The Bg horizon has hue of 10YR or 5Y, value of 5 or 6, and chroma of 1. It has few to many brownish mottles. It is clay or silty clay.

A Cg horizon is below a depth of 40 inches in some pedons. It has colors similar to those of the Bg horizon. It is silty clay loam, silty clay, or clay. It ranges from slightly acid to mildly alkaline.

Bayoudan Series

The Bayoudan series consists of moderately well drained, very slowly permeable soils that formed in loamy and clayey sediments of Tertiary age. These soils are on uplands. They are unstable when wet, and landslides are common. Slopes range from 1 to 40 percent.

The soils of the Bayoudan series are very fine, montmorillonitic, thermic Aquentic Chromuderts.

Bayoudan soils commonly are near Falkner, Guyton, Providence, Ruston, and Tippah soils. Falkner, Providence, and Tippah soils are at the higher elevations. They are fine-silty. Guyton soils also are fine-silty. They are in drainageways. Ruston soils are on narrow ridgetops and the upper side slopes. They are fine-loamy.

Typical pedon of Bayoudan clay, 15 to 40 percent slopes; 16 miles east from Olla on Highway 124 to Rosefield, 1.3 miles northwest on Highway 126, about 1.1 miles north on gravel road, 0.1 mile east on improved road, 850 feet north on trail, 20 feet west of trail; NW¼SE¼ sec. 24, T. 11 N., R. 4 E.

A—0 to 3 inches; very dark grayish brown (10YR 3/2) clay; strong fine granular structure to a depth of 1 inch; in the lower part, weak coarse subangular blocky structure parting to weak fine granular; very firm; many fine and medium roots; many fine fragments of charcoal; very strongly acid; abrupt wavy boundary.

Bw1—3 to 12 inches; red (2.5YR 4/6) clay; few fine distinct grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure parting to strong fine angular blocky; very firm; common fine and medium and few coarse roots; many prominent shiny faces on peds; cracks ranging from ½ to ¾ inch wide and extending from the surface to a depth of 36 inches; extremely acid; clear wavy boundary.

Bw2—12 to 22 inches; yellowish brown (10YR 5/4) clay; common medium prominent yellowish red (5YR 5/6) and few medium faint yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; very firm; common fine, medium, and coarse roots; many shiny faces on peds; few large intersecting slickensides; few fine angular pebbles of ironstone; common cracks ½ to ¾ inch wide; extremely acid; gradual wavy boundary.

By1—22 to 34 inches; light olive brown (2.5Y 5/4) clay; common medium distinct yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; extremely firm; common fine, medium, and coarse roots; many shiny faces on peds; common intersecting slickensides; few crystals of gypsum; few fine angular pebbles of ironstone; common cracks ½ inch wide; extremely acid; clear wavy boundary.

By2—34 to 68 inches; stratified grayish brown (10YR 5/2) and yellowish brown (10YR 5/4) clay; weak medium subangular blocky structure; thinly bedded; very firm; few fine, medium, and coarse roots; many clay balls and common angular fragments of clay; few crystals of gypsum; common intersecting slickensides; extremely acid.

The solum is 60 or more inches thick. The number of intersecting slickensides ranges from few to many. The effective cation-exchange capacity is 20 to 50 percent saturated with exchangeable aluminum to a depth of 30 inches or more.

The A horizon has value of 2 to 5 and chroma of 1 to 4. It is 2 to 5 inches thick. It ranges from very strongly acid to medium acid. It is silt loam, silty clay loam, or clay.

The upper part of the Bw horizon has hue of 2.5YR, 5YR, 7.5YR, or 10YR, value of 4 or 5, and chroma of 4 to 8. The lower part has the same range in color as the upper part, or it has hue of 2.5Y or 5Y, value of 4 to 6, and chroma of 2 to 4. This horizon has few to many mottles in shades of brown, red, or gray. It ranges from extremely acid to strongly acid.

The By horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2 to 4. Mottles, if they occur, are in shades of brown, red, or gray. This horizon ranges from extremely acid to moderately alkaline.

Bienville Series

The Bienville series consists of somewhat excessively drained, moderately rapidly permeable soils that formed in sandy sediments of late Pleistocene age. These soils are on low stream terraces. They are subject to rare flooding. Slopes range from 1 to 3 percent.

The soils of the Bienville series are sandy, siliceous, thermic Psammentic Paleudalfs.

Bienville soils commonly are near Cahaba, Guyton, Jena, Ouachita, and Zenoria soils. Cahaba soils are in landscape positions similar to those of the Bienville soils. They are fine-loamy. Guyton and Ouachita soils are fine-silty. Guyton soils are lower on the landscape than the Bienville soils, and Ouachita soils are on alluvial plains. Jena soils also are on alluvial plains. They are coarse-loamy. Zenoria soils are lower on the landscape than the Bienville soils. They are fine-loamy.

Typical pedon of Bienville loamy fine sand, 1 to 3 percent slopes; about 0.5 mile west of Zenoria, 0.75 mile southeast on Highway 500 from the Little River bridge, 0.5 mile west on improved road to a pasture gate, 75 feet southwest from gate along fence, 54 feet southeast from fence; NW¼SW¼ sec. 23, T. 9 N., R. 4 E.

Ap—0 to 9 inches; dark brown (10YR 4/3) loamy fine sand; weak fine granular structure; very friable; many fine and very fine roots; strongly acid; clear smooth boundary.

E—9 to 17 inches; yellowish brown (10YR 5/4) loamy fine sand; weak coarse subangular blocky structure; very friable; many fine and very fine roots; common fine spots of pale brown fine sand; strongly acid; clear smooth boundary.

B/E—17 to 37 inches; strong brown (7.5YR 5/6) loamy fine sand (Bt); many coarse distinct light brown (7.5YR 6/4) spots and streaks of uncoated sand (E); weak coarse subangular blocky structure; very friable; common fine and very fine roots; strongly acid; clear wavy boundary.

Bt1—37 to 46 inches; strong brown (7.5YR 5/6) loamy fine sand; common fine spots and streaks of light brown (7.5YR 6/4) fine sand; weak coarse subangular blocky structure; very friable; few fine and very fine roots; common sand grains bridged and coated with clay; strongly acid; clear smooth boundary.

Bt2—46 to 64 inches; brown (7.5YR 5/4) loamy fine sand; common fine strong brown (7.5YR 5/6) spots and streaks; weak coarse subangular blocky structure; very friable; few very fine roots; sand grains bridged and coated with clay; strongly acid.

The thickness of the solum ranges from 60 to 80 inches. The content of fine particles (clay, silt, and very fine sand) ranges from 30 to 50 percent. The effective cation-exchange capacity is 20 to 50 percent saturated with exchangeable aluminum to a depth of 30 inches or more.

The A or Ap horizon has value of 4 or 5 and chroma of 2 to 4. It is 4 to 12 inches thick. It ranges from strongly acid to slightly acid.

The E horizon and the E part of the B/E horizon have hue of 10YR or 7.5YR, value of 4 to 7, and chroma of 3 or 4. They are fine sand or loamy fine sand. They range from very strongly acid to slightly acid.

The Bt horizon generally has hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 4 to 6. Some pedons have subhorizons with hue of 10YR. Some have lamellae. This horizon is fine sand, loamy fine sand, or fine sandy loam. It ranges from very strongly acid to medium acid.

Bursley Series

The Bursley series consists of poorly drained, slowly permeable soils that formed in mixed loess and loamy sediments of late Pleistocene age. These soils are on low stream terraces at the elevation of flood plains. They are rarely or occasionally flooded. Slopes generally are less than 1 percent.

The soils of the Bursley series are fine-silty, mixed, thermic Aeric Glossaqualfs.

The Bursley soils in this parish are taxadjuncts to the series because they do not have a thin blanket of recent alluvium (a Bw horizon) overlying terrace deposits of mixed loess and alluvium. This difference does not significantly affect the use and management of the soils.

Bursley soils are similar to Guyton soils and commonly are near Deerford, Foley, and Forestdale soils. Guyton soils are on low terraces. They have siliceous mineralogy. Deerford and Foley soils have a high level of sodium in the subsoil. Deerford soils are slightly higher on the landscape than the Bursley soils, and Foley soils are lower. Forestdale soils are slightly lower on the landscape than the Bursley soils. They have a fine textured control section.

Typical pedon of Bursley silt loam, occasionally flooded; about 18 miles south of Jena, in the Saline Wildlife Management Area, 1.2 miles west on Cypress Bayou Road from its junction with Hunt Road, 250 feet west of curve in road, 45 feet south of trail; NE¼NE¼ sec. 14, T. 5 N., R. 4 E.

A—0 to 3 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable; many fine and very fine roots; extremely acid; clear smooth boundary.

E—3 to 6 inches; grayish brown (10YR 5/2) silt loam; common fine distinct yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; friable; many fine and very fine and common medium roots; very strongly acid; clear smooth boundary.

BE—6 to 11 inches; grayish brown (2.5Y 5/2) silt loam; common fine distinct light olive brown (2.5Y 5/4) and yellowish brown (10YR 5/6) and few fine prominent dark brown (7.5YR 4/4) mottles; weak coarse subangular blocky structure; friable; common fine, medium, and coarse roots; faint discontinuous clay films on faces of some peds; common thin patches and streaks of clean silt on some surfaces; few fine and medium hard black nodules of iron and manganese oxide; very strongly acid; clear wavy boundary.

Bt/E1—11 to 16 inches; mottled yellowish brown (10YR 5/6) and grayish brown (2.5Y 5/2) silty clay loam (Bt); few fine prominent dark brown (7.5YR 4/4) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; common fine, medium, and coarse roots; faint continuous grayish brown (10YR 5/2) clay films on faces of peds; few fine patches or streaks of clean silt on faces of some peds; 15 to 20 percent of the horizon occurring as tongues of light brownish gray (2.5Y 6/2) silt loam (E) ½ inch to 2 inches wide; few fine and medium hard black nodules of iron and manganese oxide; strongly acid; clear irregular boundary.

Bt/E2—16 to 34 inches; mottled grayish brown (10YR 5/2), yellowish brown (10YR 5/6), and dark yellowish brown (10YR 4/4) silty clay loam (Bt); moderate coarse prismatic structure parting to moderate medium subangular blocky; firm; common fine, medium, and coarse roots; faint continuous dark gray (10YR 4/2) clay films on faces of peds; few fine patches and streaks of clean silt on faces of some peds; about 20 percent of the horizon occurring as tongues of light brownish gray (2.5Y 6/2) silt loam (E) ½ inch to 2 inches wide; common fine to coarse black and brown nodules of iron and manganese oxide; strongly acid; clear irregular boundary.

Bt—34 to 46 inches; mottled grayish brown (10YR 5/2), yellowish brown (10YR 5/6), and dark yellowish brown (10YR 4/4) silty clay loam; weak coarse prismatic structure parting to moderate medium subangular blocky; firm; common fine and very fine roots; faint discontinuous dark grayish brown (10YR 4/2) clay films on faces of some peds; few tongues

of light brownish gray (2.5Y 6/2) silt loam; common fine to coarse, soft to hard black and brown nodules of iron and manganese oxide; strongly acid; clear wavy boundary.

2Btb—46 to 54 inches; mottled yellowish brown (10YR 5/6), grayish brown (10YR 5/2), and dark yellowish brown (10YR 4/4) clay loam; weak coarse prismatic structure parting to weak medium subangular blocky; friable; faint discontinuous gray (10YR 5/1) clay films on faces of peds; common medium and coarse brown and black brittle masses; few fine and medium hard black nodules of iron and manganese oxide; strongly acid; clear wavy boundary.

2BCb—54 to 65 inches; mottled dark brown (7.5YR 4/4) and yellowish brown (10YR 5/4, 5/6) loam; common medium prominent gray (10YR 5/1) mottles; weak coarse prismatic structure; friable; faint discontinuous clay films; few medium and coarse brown and black brittle masses; few fine and medium hard black nodules of iron and manganese oxide; strongly acid.

The solum is more than 60 inches thick. Depth to the 2Bt horizon ranges from 40 to 60 inches. The effective cation-exchange capacity is 20 to 50 percent saturated with exchangeable aluminum to a depth of 30 inches or more.

The A horizon has value of 3 or 4 and chroma of 2 to 4. It is 3 to 8 inches thick. It ranges from extremely acid to medium acid.

The E horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2. It ranges from very strongly acid to medium acid. It is 2 to 6 inches thick. Tongues of E material extend to a depth of 25 to 45 inches.

The BE horizon, the Bt part of the Bt/E horizon, and the Bt horizon have hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2, 4, or 6. The E material has value of 5 or 6 and chroma of 2. The BE and Bt horizons are silty clay loam or silt loam. Peds are coated or partly coated with grayish clay films. Reaction ranges from very strongly acid to medium acid.

The 2Btb and 2BCb horizons have hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 to 6. They are dominantly silty clay loam, clay loam, loam, or very fine sandy loam, but some pedons have strata of clay below a depth of 40 inches. These horizons range from very strongly acid to neutral.

Cahaba Series

The Cahaba series consists of well drained, moderately permeable soils that formed in loamy and sandy sediments of late Pleistocene age. These soils are on stream terraces. They are subject to rare flooding. Slopes range from 1 to 3 percent.

The soils of the Cahaba series are fine-loamy, siliceous, thermic Typic Hapludults.

Cahaba soils are similar to Ruston and Smithdale soils and commonly are near Bienville, Guyton, Ouachita, and Zenoria soils. Ruston and Smithdale soils are on uplands. Their solum is more than 60 inches thick. Bienville soils are slightly lower on the landscape than the Cahaba soils. They are sandy throughout. Guyton and Ouachita soils are fine-silty. The poorly drained Guyton soils are in swales, and the well drained Ouachita soils are on alluvial plains. The poorly drained Zenoria soils are lower on the landscape than the Cahaba soils. They have a subsurface layer of clay.

Typical pedon of Cahaba fine sandy loam, 1 to 3 percent slopes; about 0.4 mile north of Zenoria, 0.3 mile southeast on Highway 500 from the Little River bridge, 625 feet east along the south edge of a pasture, 166 feet north and 200 feet east of the southeast corner of the pasture; NW¼NE¼ sec. 23, T. 9 N., R. 1 E.

Ap—0 to 8 inches; brown (10YR 4/3) fine sandy loam; weak medium granular structure; very friable; many fine, medium, and coarse roots; strongly acid; clear smooth boundary.

E—8 to 14 inches; yellowish brown (10YR 5/4) fine sandy loam; weak coarse subangular blocky structure; very friable; many fine and medium and common coarse roots; strongly acid; clear smooth boundary.

B/E—14 to 18 inches; yellowish red (5YR 4/6) loam (B); weak coarse subangular blocky structure; very friable; common fine, medium, and coarse roots; common fine spots of yellowish brown (10YR 5/4) fine sandy loam (E); faint discontinuous clay films on faces of peds and in pores; strongly acid; clear smooth boundary.

Bt1—18 to 29 inches; yellowish red (5YR 4/6) clay loam; moderate medium subangular blocky structure; friable; common fine, medium, and coarse roots; faint discontinuous clay films on faces of peds; very strongly acid; clear smooth boundary.

Bt2—29 to 36 inches; yellowish red (5YR 4/6) sandy clay loam; moderate medium subangular blocky structure; firm; common fine and medium and few coarse roots; faint discontinuous clay films on faces of peds; very strongly acid; clear smooth boundary.

BC—36 to 46 inches; strong brown (7.5YR 5/8) fine sandy loam; weak coarse subangular blocky structure; very friable; few fine, medium, and coarse roots; sand grains bridged and coated with clay; very strongly acid; clear smooth boundary.

C1—46 to 56 inches; brownish yellow (10YR 6/6) loamy sand; common fine faint yellowish brown mottles;

single grained; loose; few fine roots; strongly acid; clear smooth boundary.

C2—56 to 75 inches; coarsely mottled strong brown (7.5YR 5/6) and brownish yellow (10YR 6/6) loamy sand; single grained; loose; very strongly acid.

The thickness of the solum ranges from 36 to 60 inches. Reaction ranges from very strongly acid to medium acid throughout the profile. The effective cation-exchange capacity is 50 percent or more saturated with exchangeable aluminum to a depth of 30 inches or more.

The A or Ap horizon has value of 3 to 5 and chroma of 2 to 4. It is 4 to 8 inches thick.

The E horizon, if it occurs, and the E part of the B/E horizon have hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2 to 4. They are fine sandy loam, sandy loam, or loamy fine sand.

The Bt part of the B/E horizon and the Bt horizon have hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 to 8. They are sandy clay loam, clay loam, or loam. The BC or CB horizon, if it occurs, is strong brown, yellowish red, or red. It is sandy loam or fine sandy loam.

The C horizon is yellowish brown to red. It is sand, loamy sand, or fine sandy loam.

Deerford Series

The Deerford series consists of somewhat poorly drained, slowly permeable soils that formed in a thin layer of silty deposits underlain by loamy sediments of late Pleistocene age. These soils are on low stream terraces at the elevation of flood plains. They are rarely or occasionally flooded. Slopes are less than 1 percent.

The soils of the Deerford series are fine-silty, mixed, thermic Albic Glossic Natraqualfs.

The Deerford soils in this parish are taxadjuncts because reaction in the A and Btn/E horizons is lower than is defined as the range for the series and the content of organic matter in the A horizon is slightly higher. Also, buried horizons are at a depth of about 43 inches. These differences do not significantly affect the use and management of the soils.

Deerford soils commonly are near Bursley, Foley, and Forestdale soils. Bursley and Forestdale soils are slightly lower on the landscape than the Deerford soils. They do not have a natric horizon. The poorly drained Foley soils are lower on the landscape than the Deerford soils. Also, they have a somewhat grayer subsoil.

Typical pedon of Deerford silt loam; about 14 miles south of Jena, in the Saline Wildlife Management Area, 0.5 mile northeast from Diversion Canal levee on Highway 28, about 1.6 miles east on gravel road, 168 feet north from center of road; SW¼SE¼ sec. 21, T. 6 N., R. 4 E.

A—0 to 3 inches; grayish brown (10YR 5/2) silt loam; moderate fine granular structure; friable; many fine and medium roots; extremely acid; clear smooth boundary.

E—3 to 9 inches; grayish brown (2.5Y 5/2) silt loam; common fine prominent strong brown (7.5YR 5/8) mottles; weak coarse subangular blocky structure; friable; many fine, medium, and coarse roots; very strongly acid; clear wavy boundary.

B/E—9 to 21 inches; mottled grayish brown (2.5Y 5/2) and yellowish brown (10YR 5/6, 5/4) silty clay loam (Bt); few fine distinct strong brown (7.5YR 5/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; common fine and medium roots; faint discontinuous grayish brown (10YR 5/2) clay films on faces of peds; about 15 to 20 percent of the horizon occurring as tongues of light brownish gray (2.5Y 6/2) silt loam (E) 1 to 2 inches wide; common thin silt coatings on vertical faces of peds; very strongly acid; clear irregular boundary.

Btn/E—21 to 43 inches; mottled grayish brown (2/5Y 5/2) and brown (7.5YR 4/4, 5/4) silty clay loam (Bt); moderate coarse prismatic structure parting to moderate medium subangular blocky; firm; few fine, medium, and coarse roots; faint continuous grayish brown (10YR 5/2) clay films on vertical faces of peds; many fine to coarse hard black and dark brown nodules of iron and manganese oxide; about 20 percent of the horizon occurring as tongues of light brownish gray (2.5Y 6/2) silt loam (E) 1 to 2 inches wide; very strongly acid; clear wavy boundary.

2Btnb1—43 to 51 inches; mottled grayish brown (10YR 5/2), yellowish brown (10YR 5/6), and brown (7.5YR 4/4) loam; weak coarse prismatic structure; firm; few fine and medium roots; faint discontinuous gray (10YR 5/1) clay films on vertical faces of peds; many fine to coarse hard black and dark brown nodules of iron and manganese oxide; few fine pockets and streaks of white salt crystals; medium acid; gradual wavy boundary.

2Btnb2—51 to 65 inches; mottled strong brown (7.5YR 5/6), light brown (7.5YR 6/4), and grayish brown (10YR 5/2) loam; weak coarse prismatic structure; friable; faint discontinuous dark brown (7.5YR 4/2) clay films on vertical faces of peds; common fine pockets of white salt crystals; slightly acid.

The part of the solum above lithologic discontinuity

ranges from 30 to 60 inches in thickness. The depth to a subhorizon with more than 15 percent exchangeable sodium ranges from 16 to 32 inches.

The A horizon has value of 4 or 5 and chroma of 2 or 3. It is 3 to 8 inches thick. It ranges from extremely acid to medium acid.

The E horizon and the E part of the B/E horizon have hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2. They range from very strongly acid to medium acid. Tongues of E material extend to a depth of 25 to 45 inches. The E horizon is 3 to 12 inches thick.

The Bt horizon and the Bt part of the B/E horizon have hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2. They are silty clay loam or silt loam. They range from very strongly acid to slightly acid.

The 2Btn horizon and the Btn part of the Btn/E horizon have hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. They are silty clay loam, silt loam, clay loam, or loam. They range from medium acid to moderately alkaline.

Dundee Series

The Dundee series consists of somewhat poorly drained, moderately slowly permeable soils that formed in loamy old alluvium. These soils are in high positions on natural levees of distributaries along the Mississippi River. Slopes are generally less than 1 percent.

The soils of the Dundee series are fine-silty, mixed, thermic Aeric Ochraqualfs.

Dundee soils commonly are near Alligator, Sharkey, and Tensas soils. Alligator and Sharkey soils are lower on the landscape than the Dundee soils. They have a surface layer and subsoil of clay. Tensas soils are slightly lower on the landscape than the Dundee soils. They are clay in the upper part of the subsoil.

Typical pedon of Dundee loam; 7 miles south of Whitehall, in the Catahoula National Wildlife Refuge, 0.4 mile northeast on Highway 28 from the Muddy Bayou bridge, 0.3 mile north on improved road, 0.5 mile west on improved road to the National Wildlife Refuge boundary, 250 feet west on road from boundary fence, 66 feet south of road; NW¼NE¼ sec. 9, T. 6 N., R. 4 E.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) loam; weak medium granular structure; very friable; many fine and medium roots; strongly acid; clear smooth boundary.

Btg1—6 to 14 inches; grayish brown (10YR 5/2) clay loam; common fine and medium distinct dark yellowish brown (10YR 4/4) mottles; moderate medium subangular blocky structure; firm; many fine and very fine and common medium and coarse roots; faint nearly continuous dark grayish brown (10YR 4/2) clay films on faces of peds; few fine soft dark brown masses of iron and manganese oxide; medium acid; clear smooth boundary.

Btg2—14 to 23 inches; grayish brown (10YR 5/2) clay loam; few fine distinct strong brown (7.5YR 5/6) and common fine distinct brown (7.5YR 4/4) mottles; moderate medium subangular blocky structure; firm; common fine, medium, and coarse roots; faint discontinuous dark grayish brown (10YR 4/2) clay films on faces of some peds; few fine soft dark brown masses of iron and manganese oxide; medium acid; clear smooth boundary.

Btg3—23 to 33 inches; grayish brown (10YR 5/2) clay loam; few fine distinct strong brown (7.5YR 5/6) and common fine distinct brown (7.5YR 4/4) mottles; weak coarse subangular blocky structure; friable; common fine and few medium and coarse roots; many fine and very fine pores; faint discontinuous clay films on faces of peds; few fine soft dark brown masses of iron and manganese oxide; medium acid; clear smooth boundary.

2Cg1—33 to 43 inches; grayish brown (10YR 5/2) very fine sandy loam; few fine and medium distinct dark yellowish brown (10YR 4/6) and yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; very friable; few fine, medium, and coarse roots; many fine and very fine pores; few fine soft dark brown masses of iron and manganese oxide; neutral; clear smooth boundary.

2Cg2—43 to 60 inches; grayish brown (10YR 5/2) very fine sandy loam; common fine and medium distinct dark yellowish brown (10YR 4/6) mottles; massive; very friable; few very fine roots; many fine and very fine pores; few fine soft dark brown masses of iron and manganese oxide; neutral.

The thickness of the solum ranges from 30 to 60 inches.

The Ap horizon has value of 4 or 5 and chroma of 2 or 3 or value of 3 and chroma of 2. It is 4 to 8 inches thick. It is less than 6 inches thick in pedons that have value of 3. This horizon ranges from very strongly acid to medium acid.

The Btg horizon has value of 4 or 5 and chroma of 2. It has few to many mottles in shades of brown or gray. It is silty clay loam, clay loam, or sandy clay loam. It ranges from very strongly acid to medium acid.

Some pedons have a BC horizon. This horizon has colors similar to those of the Btg horizon, but the range includes value of 6 and chroma of 1. This horizon has few to many mottles in shades of brown or gray. It is clay loam, silty clay loam, or sandy clay loam. It ranges from very strongly acid to neutral.

The 2Cg horizon has value of 5 or 6 and chroma of 1 or 2. It has few to many mottles in shades of brown or gray. It is dominantly loam, silt loam, or very fine sandy loam. In some pedons, however, layers of silty clay or clay are below a depth of 40 inches. This horizon ranges from strongly acid to neutral.

Falkner Series

The Falkner series consists of somewhat poorly drained soils that formed in a silty mantle of late Pleistocene age and in the underlying clayey and loamy sediments of Tertiary age. These soils are moderately slowly permeable in the upper part and slowly permeable in the lower part. They are on uplands. Slopes range from 0 to 2 percent.

The soils of the Falkner series are fine-silty, siliceous, thermic Aquic Paleudalfs.

The Falkner soils in this parish are taxadjuncts because they have slightly higher reaction, slightly higher bulk density, and slightly less clay in the 2Bt horizon than is defined as the range for the series. These differences do not significantly affect the use and management of the soils.

Falkner soils are similar to Vick soils and commonly are near Bayoudan, Guyton, Providence, and Tippah soils. Vick soils are lower on the landscape than the Falkner soils. Also, they have less clay in the lower part of the subsoil. Bayoudan soils are on the lower side slopes. They are clayey throughout. Guyton soils are in depressions and drainageways. They are grayish and loamy throughout. Providence soils are higher on the landscape than the Falkner soils. They are loamy throughout and have a fragipan. Tippah soils are on the slightly more convex slopes. They have mixed mineralogy.

Typical pedon of Falkner silt loam; about 4.5 miles northeast of Summerville, 1.3 miles east on Highway 503 from its junction with Highway 127, about 1.2 miles north on improved parish road, 2.3 miles northeast on gravel road to intersection, 112 feet east of intersection in woods; NW¼NE¼ sec. 35, T. 10 N., R. 3 E.

Ap—0 to 4 inches; dark grayish brown (10YR 4/2) silt loam; weak medium granular structure; very friable; common fine and very fine roots; strongly acid; clear smooth boundary.

Bt1—4 to 12 inches; yellowish brown (10YR 5/4) silt loam; common fine faint brown (10YR 4/3) mottles; weak medium subangular blocky structure; very friable; common fine, medium, and coarse roots; faint discontinuous clay films on vertical faces of some peds; very strongly acid; clear wavy boundary.

Bt2—12 to 17 inches; yellowish brown (10YR 5/4) silt loam; few fine faint grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; very friable; common fine, medium, and coarse roots; faint discontinuous clay films on vertical faces of peds; few fine hard black nodules of iron and manganese oxide; strongly acid; clear wavy boundary.

Bt3—17 to 22 inches; mottled yellowish brown (10YR 5/4, 5/6) and grayish brown (10YR 5/2) silt loam; moderate medium subangular blocky structure; friable; common fine, medium, and coarse roots; faint discontinuous clay films on vertical faces of peds; common thin silt coatings on faces of peds; few fine hard black nodules of iron and manganese oxide; strongly acid; abrupt wavy boundary.

2Bt4—22 to 29 inches; yellowish brown (10YR 5/6) silty clay; many fine and medium distinct light gray (10YR 6/1), few fine faint strong brown, and few very fine prominent red (2.5YR 4/6) mottles; moderate coarse subangular blocky structure; very firm, plastic; common fine, medium, and coarse roots; faint discontinuous clay films on faces of peds; few fine hard black nodules of iron and manganese oxide; strongly acid; clear wavy boundary.

2Bt5—29 to 38 inches; yellowish brown (10YR 5/6) silty clay loam; few fine distinct grayish brown (10YR 5/2) mottles; moderate coarse subangular blocky structure; very firm, plastic; few fine and medium roots; faint discontinuous clay films on faces of peds; few fine hard black nodules of iron and manganese oxide; very strongly acid; clear wavy boundary.

2Bt6—38 to 51 inches; yellowish brown (10YR 5/6) silty clay loam; many fine and medium distinct grayish brown (10YR 5/2) and brown (10YR 5/3) mottles; weak coarse subangular blocky structure; very firm, plastic; few fine and medium roots; faint discontinuous clay films on faces of peds; few fine hard black nodules of iron and manganese oxide; many fine black web-shaped stains on faces of peds; medium acid; clear wavy boundary.

2Bt7—51 to 70 inches; mottled yellowish brown (10YR 5/6, 5/4) and grayish brown (10YR 5/2) silty clay loam; weak coarse subangular blocky structure; firm; faint discontinuous clay films on vertical faces of peds; few fine hard black nodules of iron and manganese oxide; few fine black web-shaped stains on faces of peds; neutral; gradual wavy boundary.

2Btg—70 to 85 inches; grayish brown (10YR 5/2) silty clay loam; many medium distinct yellowish brown (10YR 5/4) and common medium distinct dark yellowish brown (10YR 4/6) mottles; weak coarse

subangular blocky structure; firm; faint discontinuous clay films on faces of peds; few fine hard black nodules of iron and manganese oxide; few fine black web-shaped stains on faces of peds; few fine soft masses of gypsum and calcium carbonate; neutral.

The solum is more than 60 inches thick. Depth to the clayey 2Bt horizon ranges from 15 to 35 inches. The effective cation-exchange capacity is 50 percent or more saturated with exchangeable aluminum to a depth of 30 inches or more.

The Ap or A horizon has value of 3 or 4 and chroma of 2 or 3. It is 4 to 8 inches thick. It ranges from very strongly acid to medium acid.

Some pedons have an E horizon. This horizon is silt loam. It has value of 5 or 6 and chroma of 2 to 4. It ranges from very strongly acid to medium acid.

The Bt horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 to 6. It has few to many grayish mottles, or it is mottled in shades of gray, brown, or yellow. This horizon is silt loam or silty clay loam. It ranges from very strongly acid to medium acid.

The 2Bt and 2Btg horizons have hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 6. They are mottled in shades of gray, brown, or yellow. They are clay, silty clay, or silty clay loam. Some pedons have accumulations of gypsum and calcium carbonate below a depth of 40 inches. These horizons range from very strongly acid to neutral.

Fausse Series

The Fausse series consists of very poorly drained, very slowly permeable soils that formed in clayey alluvium. These soils are in old channel scars and depressional areas on alluvial plains. They are ponded or flooded for long periods each year. Slopes generally are less than 1 percent.

The soils of the Fausse series are very fine, montmorillonitic, nonacid, thermic Typic Fluvaquents.

Fausse soils commonly are near Alligator, Forestdale, Sharkey, Tensas, and Una soils. Alligator and Sharkey soils are slightly higher on the landscape than the Fausse soils. They crack to a depth of 20 inches in most years. Forestdale, Tensas, and Una soils are slightly higher on the landscape than the Fausse soils. Forestdale and Tensas soils are loamy in the lower part of the subsoil. Una soils are more acid in the control section than the Fausse soils.

Typical pedon of Fausse clay, frequently flooded; about 9 miles southeast of Jena, in the Catahoula National Wildlife Refuge, 1.2 miles southwest from the refuge headquarters on gravel road to Cowpen Bayou, 1.4 miles southwest on gravel road, 1,150 feet south to edge of Little Lake; SE¼SW¼ sec. 26, T. 7 N., R. 4 E.

Oe—0 to 2 inches; very dark grayish brown (10YR 3/2) muck; many fine and very fine roots; medium acid; clear wavy boundary.

A—2 to 7 inches; dark gray (10YR 4/1) clay; many fine and medium prominent strong brown (7.5YR 5/8) mottles; weak coarse subangular blocky structure parting to weak fine granular; sticky and very plastic; common fine and very fine roots; strongly acid; clear wavy boundary.

Bg1—7 to 12 inches; gray (5Y 5/1) clay; many fine and medium prominent dark brown (7.5YR 4/4) and few fine prominent reddish brown (5YR 4/4) mottles; weak coarse subangular blocky structure; sticky and very plastic; common fine and very fine roots; neutral; clear wavy boundary.

Bg2—12 to 25 inches; dark gray (N 4/0) clay; common fine faint olive (5Y 4/4) mottles; weak coarse subangular blocky structure; sticky and very plastic; common fine and very fine roots; common fine soft black masses of organic material; mildly alkaline; clear wavy boundary.

Bg3—25 to 41 inches; gray (5Y 5/1) clay; many fine and medium distinct olive (5Y 5/4) and few medium faint dark greenish gray (5GY 4/1) mottles; weak coarse subangular blocky structure; sticky and very plastic; few fine roots; mildly alkaline; clear wavy boundary.

Cg—41 to 62 inches; gray (5Y 5/1) clay; many fine prominent dark brown (7.5YR 4/4), common fine prominent strong brown (7.5YR 5/6), and few fine faint olive (5Y 5/4) mottles; massive; sticky and very plastic; few fine roots; neutral.

The thickness of the solum ranges from 25 to 50 inches. The soils are continuously saturated or above field capacity to a depth of 24 inches or more in most years. Cracks do not form below a depth of 20 inches in most years.

The Oe horizon, if it occurs, has value of 2 or 3 and chroma of 1 or 2. It is 0 to 4 inches thick. It ranges from medium acid to neutral.

The A horizon has value of 4 and chroma of 1 or 2. Where the horizon is less than 10 inches thick, it has value of 3 and chroma of 1 or 2. It is clay or mucky clay. It is 4 to 12 inches thick. It ranges from medium acid to neutral.

The Bg horizon has hue of 10YR or 5Y, value of 4 or 5, and chroma of 1, or it is neutral in hue and has value of 4 or 5. This horizon ranges from slightly acid to moderately alkaline.

The Cg horizon has hue of 5Y or 5GY, value of 4 or

5, and chroma of 1, or it is neutral in hue and has value of 4 or 5. This horizon ranges from neutral to moderately alkaline. It is clay, silty clay, or silty clay loam.

Foley Series

The Foley series consists of poorly drained, very slowly permeable soils that formed in loamy sediments of late Pleistocene age. These soils have a high level of sodium in the subsoil. They are on broad flats on low stream terraces at the elevation of flood plains. They are occasionally flooded. Slopes generally are less than 1 percent.

The soils of the Foley series are fine-silty, mixed, thermic Albic Glossic Natraqualfs.

Foley soils commonly are near Bursley, Deerford, Guyton, and Forestdale soils. Bursley and Forestdale soils are slightly higher on the landscape than the Foley soils. They do not have a high level of sodium in the subsoil. Deerford soils are higher on the landscape than the Foley soils. Also, they have a somewhat browner subsoil. Guyton soils are in landscape positions similar to those of the Foley soils. They do not have a high level of sodium in the subsoil.

Typical pedon of Foley silt loam, occasionally flooded; about 20 miles south of Jena, in the Saline Wildlife Management Area, 0.4 mile east on Muddy Bayou Road from its junction with Big Ridge Road, 0.45 mile north on oil field road to pipeline, 360 feet east on pipeline from center of road, 42 feet north from center of pipeline; NE¼NE¼ sec. 25, T. 5 N., R. 3 E.

A—0 to 3 inches; dark grayish brown (10YR 4/2) silt loam; weak medium granular structure; very friable; many fine and medium and few coarse roots; very strongly acid; clear smooth boundary.

E—3 to 7 inches; light brownish gray (10YR 6/2) silt loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; very friable; many fine and medium and common coarse roots; strongly acid; clear smooth boundary.

BE—7 to 14 inches; light brownish gray (10YR 6/2) silt loam; many fine and medium distinct yellowish brown (10YR 5/6) and few fine prominent strong brown (7.5YR 5/6) mottles; weak coarse subangular blocky structure; friable; common fine, medium, and coarse roots; few discontinuous coatings of silt or very fine sand on faces of some peds; few fine soft black nodules of iron and manganese oxide; strongly acid; clear irregular boundary.

Btg—14 to 21 inches; grayish brown (2.5Y 5/2) silty clay loam; many fine and medium prominent strong brown (7.5YR 4/6) and yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; firm; many fine and very fine and common medium and coarse roots; faint discontinuous dark grayish brown (2.5Y 4/2) clay films on faces of some peds; interfingering of light gray (10YR 7/1) silt 1 to 5 millimeters thick throughout; common krotovinas of gray (N 6/0) silt loam 1 to 3 inches in diameter; few fine soft and hard black nodules of iron and manganese oxide; neutral; clear irregular boundary.

Btgn1—21 to 31 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine and medium distinct yellowish brown (10YR 5/6) mottles; moderate coarse prismatic structure parting to moderate medium angular blocky; very firm; common fine and very fine and few medium and coarse roots; faint nearly continuous clay films on faces of peds; light gray (10YR 6/1) silt interfingering between prisms; common krotovinas of gray (N 6/0) silt loam 1 to 3 inches in diameter; common fine hard black nodules of iron and manganese oxide; common black web-shaped stains on faces of peds; neutral; clear wavy boundary.

Btgn2—31 to 42 inches; light olive gray (5Y 6/2) silty clay loam; few fine and medium distinct light olive brown (2.5Y 5/4) mottles; moderate coarse prismatic structure; very firm; few very fine roots; faint discontinuous clay films on faces of peds; common black web-shaped stains on some peds; common fine soft and hard black nodules of iron and manganese oxide; neutral; clear wavy boundary.

Btgn3—42 to 52 inches; light olive gray (5Y 6/2) silty clay loam; common medium and coarse distinct light olive brown (2.5Y 5/4, 5/6) and few fine distinct olive yellow (5Y 6/6) mottles; weak coarse prismatic structure; firm; few very fine roots; faint discontinuous clay films on faces of peds; few fine to coarse black web-shaped stains; few fine black nodules of iron and manganese oxide; common fine streaks and masses of white salt crystals; neutral; clear wavy boundary.

BCg—52 to 62 inches; light olive gray (5Y 6/2) silty clay loam; few medium and coarse distinct light olive brown (2.5Y 5/4, 5/6) and few fine prominent strong brown (7.5YR 5/6) mottles; weak coarse prismatic structure; firm; faint discontinuous clay films on vertical faces of peds; few fine soft black nodules of iron and manganese oxide; few fine masses of white salt crystals; neutral.

The thickness of the solum ranges from 50 to more than 72 inches. The content of exchangeable sodium is more than 15 percent within 16 inches of the upper

boundary of the Btg horizon. The effective cation-exchange capacity is 20 to 50 percent saturated with exchangeable aluminum to a depth of 30 inches or more.

The A horizon has value of 3 or 4 and chroma of 2 or 3. It is 3 to 5 inches thick. It ranges from very strongly acid to medium acid.

The E horizon has value of 5 or 6 and chroma of 1 or 2. It is silt loam or very fine sandy loam. It ranges from very strongly acid to medium acid.

The BE and Btg horizons have hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 or 2. They are silt loam or silty clay loam. They range from strongly acid to neutral.

The Btgn and BCg horizons have the same range in color and texture as the Btg horizon. They range from neutral to strongly alkaline.

Forestdale Series

The Forestdale series consists of poorly drained, very slowly permeable soils that formed in clayey and loamy alluvium underlain by loamy and clayey sediments of late Pleistocene age. These soils are in low areas and on broad flats on low stream terraces at the elevation of flood plains. They are rarely or occasionally flooded. Slopes generally are less than 1 percent.

The soils of the Forestdale series are fine, montmorillonitic, thermic Typic Ochraqualfs.

Forestdale soils commonly are near Bursley, Deerford, Dundee, Foley, and Sharkey soils. Bursley and Dundee soils are slightly higher on the landscape than the Forestdale soils. They are fine-silty. Deerford and Foley soils have a high level of sodium in the subsoil. Deerford soils are in the slightly higher positions, and Foley soils are in the slightly lower positions. Sharkey soils are lower on the landscape than the Forestdale soils. They have a very fine textured control section.

Typical pedon of Forestdale silty clay loam, occasionally flooded; about 22 miles south of Jena, in the Saline Wildlife Management Area, 1.6 miles south on Hunt Road from its junction with Muddy Bayou Road, 1.4 miles west on unnamed road, 190 feet north from center of road; NW¼SE¼ sec. 35, T. 5 N., R. 4 E.

A—0 to 4 inches; dark grayish brown (10YR 4/2) silty clay loam; weak coarse subangular blocky structure parting to weak fine granular; firm; many fine and very fine roots; very strongly acid; clear smooth boundary.

Btg1—4 to 23 inches; gray (10YR 5/1) silty clay; common medium prominent strong brown (7.5YR 5/6) and few fine prominent strong brown (7.5YR 4/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; very firm; common fine, medium, and coarse roots; faint continuous dark gray (10YR 4/1) clay films on vertical faces of peds and in pores; few large krotovinas of gray (10YR 6/1) silt loam and dark gray (10YR 4/1) clay to a depth of 45 inches; very strongly acid; clear wavy boundary.

Btg2—23 to 39 inches; gray (10YR 6/1) silty clay loam; many medium and coarse prominent strong brown (7.5YR 5/6) and dark yellowish brown (10YR 4/4) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; firm; common fine and medium roots; faint discontinuous gray (10YR 5/1) clay films on faces of peds; few fine soft black masses of iron and manganese oxide; few thin patches of clean silt on faces of some peds; strongly acid; clear wavy boundary.

BCg—39 to 65 inches; light brownish gray (2.5Y 6/2) silt loam; many fine and medium prominent dark yellowish brown (10YR 4/4) and common fine prominent strong brown (7.5YR 5/6) mottles; weak coarse prismatic structure; friable; few fine and medium roots; faint discontinuous clay films on faces of peds; common fine and medium soft black masses of iron and manganese oxide; few thin patches of clean silt on faces of some peds; medium acid.

The thickness of the solum ranges from 40 to 80 inches. The effective cation-exchange capacity is 50 percent or more saturated with exchangeable aluminum to a depth of 30 inches or more.

The A horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. It is 4 to 10 inches thick. It ranges from very strongly acid to medium acid.

The Btg horizon has hue of 10YR or 2.5Y. It has value of 4 or 5 and chroma of 1 or value of 6 and chroma of 1 or 2. It is silty clay loam, silty clay, or clay. It ranges from very strongly acid to medium acid.

The BCg horizon has the same range in color as the Btg horizon. It is very fine sandy loam, silt loam, or silty clay loam. It ranges from strongly acid to mildly alkaline.

Frizzell Series

The Frizzell series consists of somewhat poorly drained, slowly permeable soils that formed in loamy sediments of late Pleistocene age. These soils are on stream terraces. Slopes are 0 to 1 percent.

The soils of the Frizzell series are coarse-silty, siliceous, thermic Glossaquic Hapludalfs.

Frizzell soils are similar to Pheba soils and

commonly are near Guyton soils. Pheba soils are at the higher elevations. They have a fragipan. Guyton soils are slightly lower on the landscape than the Frizzell soils. They are fine-silty.

Typical pedon of Frizzell silt loam; about 1 mile east of Olla, 0.4 mile east on Highway 124 from its junction with Highway 165, about 0.3 mile south on improved road to pipeline right-of-way, 0.25 mile southwest on pipeline, 142 feet west of fence, 30 feet west of corner of woods; NW¼NE¼ sec. 36, T. 11 N., R. 2 E.

A—0 to 3 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; very friable; many fine and very fine roots; very strongly acid; clear smooth boundary.

E—3 to 7 inches; brown (10YR 5/3) silt loam; common fine faint pale brown (10YR 6/3) and few fine distinct yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; very friable; many fine and medium and few coarse roots; few fine hard black nodules of iron and manganese oxide; very strongly acid; clear wavy boundary.

Bt—7 to 18 inches; yellowish brown (10YR 5/4) silt loam; many fine and medium distinct grayish brown (10YR 5/2) and common medium distinct yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; very friable; many fine and medium and few coarse roots; faint discontinuous clay films on faces of peds; few thin silt coatings on faces of peds; few hard black nodules of iron and manganese oxide; very strongly acid; gradual wavy boundary.

B/E—18 to 29 inches; yellowish brown (10YR 5/4) silt loam (B); common fine and medium faint yellowish brown (10YR 5/6) and many medium distinct grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; very friable; common fine and medium and few coarse roots; faint discontinuous clay films on faces of peds; common spots, streaks, and interfingers of light gray (10YR 6/1) silt (E); few fine hard black nodules of iron and manganese oxide; very strongly acid; clear wavy boundary.

B't1—29 to 39 inches; dark brown (10YR 4/3) silty clay loam; common fine and medium distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few fine and medium roots; faint discontinuous clay films on faces of some peds; thin silt coatings on faces of some peds; few fine hard black nodules of iron and manganese oxide; strongly acid; clear wavy boundary.

B't2—39 to 52 inches; yellowish brown (10YR 5/4) silt loam; few fine and medium distinct dark yellowish brown (10YR 4/6) and common medium distinct grayish brown (10YR 5/2) mottles; weak coarse subangular blocky structure; friable; slightly brittle; few fine and medium roots; faint discontinuous clay films on faces of peds; thin silt coatings on faces of some peds; few fine hard black nodules of iron and manganese oxide; strongly acid; clear wavy boundary.

B't3—52 to 64 inches; yellowish brown (10YR 5/4) silt loam; common fine and medium distinct brown (10YR 5/3) and grayish brown (10YR 5/2) mottles; weak very coarse prismatic structure; friable; few fine and medium roots; faint discontinuous clay films on faces of peds; few fine hard black nodules of iron and manganese oxide; very strongly acid.

The thickness of the solum ranges from 60 to 80 inches. Except for the surface layer in areas that have been limed, reaction is very strongly acid or strongly acid throughout the profile. The effective cation-exchange capacity is 50 percent or more saturated with exchangeable aluminum to a depth of 30 inches or more.

The A horizon has value of 4 or 5 and chroma of 2 or 3. It is 1 to 4 inches thick. The E horizon has value of 5 or 6 and chroma of 3 or 4.

The Bt part of the B/E horizon and the Bt horizon have value of 5 or 6 and chroma of 3 to 6. They are silt loam or loam. The E part of the B/E horizon consists of streaks or spots of silt loam. It has value of 5 or 6 and chroma of 1 to 3.

The Bt and B't horizons have value of 4 to 6 and chroma of 3 to 6. They are silt loam, silty clay loam, or clay loam. The content of sand ranges from 10 to 30 percent. The sand is dominantly very fine.

Gore Series

The Gore series consists of moderately well drained, very slowly permeable soils that formed in loamy and clayey sediments of late or mid Pleistocene age. These soils are on uplands. Slopes range from 5 to 15 percent.

The soils of the Gore series are fine, mixed, thermic Vertic Paleudalfs.

Gore soils are similar to Bayoudan soils and commonly are near Libuse, Tippah, and Vick soils. Bayoudan soils are on the older landscapes. They have montmorillonitic mineralogy. Libuse, Tippah, and Vick soils are on ridgetops. Libuse soils are fine-silty. Tippah and Vick soils are loamy in the upper part of the subsoil.

Typical pedon of Gore silt loam, 5 to 15 percent slopes; about 1.5 miles west of Whitehall, 2.2 miles

west on Highway 460 from its junction with Highway 84, about 0.4 mile south on parish road to pipeline, 0.55 mile east on pipeline, 800 feet south of pipeline, on a slope south of a pond; SE¼ irregular sec. 38, T. 7 N., R. 4 E.

A—0 to 3 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; very friable; many fine, medium, and coarse roots; very strongly acid; clear smooth boundary.

E—3 to 6 inches; brown (10YR 5/3) silt loam; weak medium subangular blocky structure; very friable; many fine, medium, and coarse roots; few fine spots of yellowish red (5YR 5/6) silty clay loam; very strongly acid; clear smooth boundary.

Bt1—6 to 15 inches; red (2.5YR 4/6) clay; few fine distinct yellowish brown (10YR 5/6) and few fine faint grayish brown mottles; moderate medium subangular blocky structure; very firm; common fine, medium, and coarse roots; faint discontinuous clay films on faces of peds; common shiny ped faces; streaks or filled cracks of dark grayish brown (10YR 4/2) silt loam; very strongly acid; clear smooth boundary.

Bt2—15 to 25 inches; mottled red (2.5YR 4/6) and grayish brown (10YR 5/2) clay; many fine and medium distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; very firm; common fine, medium, and coarse roots; faint discontinuous clay films on faces of peds; common shiny ped faces; filled cracks of dark grayish brown (10YR 4/2) silt loam; very strongly acid; clear smooth boundary.

Bt3—25 to 38 inches; yellowish red (5YR 5/6) silty clay; few medium prominent red (2.5YR 4/8) and common fine and medium distinct grayish brown (10YR 5/2) mottles; gray (5Y 6/1) stains along root channels; weak medium subangular blocky structure; very firm; few fine, medium, and coarse roots; faint discontinuous clay films on faces of peds; common shiny ped faces; common slickensides that do not intersect; very strongly acid; clear smooth boundary.

Bt4—38 to 45 inches; yellowish red (5YR 5/6) clay; common fine and medium distinct grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; very firm; few fine and medium roots; faint discontinuous clay films on faces of peds; common shiny ped faces; common slickensides that do not intersect; noticeable increase in content of sand; few fine chert pebbles in the lower part; very strongly acid; clear smooth boundary.

BC—45 to 60 inches; yellowish red (5YR 5/6) silty clay; few medium distinct grayish brown (10YR 5/2) and strong brown (7.5YR 5/6) mottles; weak coarse subangular blocky structure; firm; few fine roots; faint discontinuous clay films on vertical faces of peds; strata of strong brown (7.5YR 5/6) coarse sand and fine to coarse chert pebbles in the lower part; very strongly acid.

The thickness of the solum ranges from 40 to more than 60 inches.

The A or Ap horizon has value of 3 to 5 and chroma of 2 or 3. It is 1 to 4 inches thick. It is very strongly acid or medium acid.

The E horizon has value of 5 or 6 and chroma of 2 or 3. It is 2 to 5 inches thick. It ranges from very strongly acid to medium acid.

Some pedons have a BE horizon. This horizon has hue of 10YR, 7.5YR, or 5YR, value of 4 to 6, and chroma of 4 to 8. It is silty clay loam or silt loam. It ranges from very strongly acid to medium acid.

The upper part of the Bt horizon has hue of 2.5YR or 5YR, value of 3 to 5, and chroma of 4 to 6. The lower part has the same range in color as the upper part or has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 or 2. Mottles are in shades of red, brown, or gray. This horizon ranges from very strongly acid to neutral.

The BC horizon has the same range in color and reaction as the Bt horizon. It is silty clay or clay. Strata of a coarser textured material are common below a depth of 40 inches.

Some pedons have a C horizon. This horizon is reddish clay or silty clay. It has a few concretions of calcium carbonate in some pedons. It ranges from medium acid to moderately alkaline.

Guyton Series

The Guyton series consists of poorly drained, slowly permeable soils that formed in loamy alluvium of Holocene to early Pleistocene age. These soils are on narrow flood plains along streams that drain the uplands. They also are on broad flats on stream terraces and uplands. They are subject to flooding unless protected by levees. Slopes generally are less than 1 percent.

The soils of the Guyton series are fine-silty, siliceous, thermic Typic Glossaqualfs.

Guyton soils are similar to Foley soils and commonly are near Bienville, Cahaba, Frizzell, Jena, Libuse, and Ouachita soils. Foley soils are in low positions on stream terraces. They have a high level of sodium in the subsoil. Bienville, Cahaba, and Frizzell soils are on stream terraces. They are higher on the landscape than the Guyton soils. Bienville soils are sandy throughout,

Cahaba soils are fine-loamy, and Frizzell soils are coarse-silty. Jena and Ouachita soils are on flood plains. They are slightly higher on the landscape than the Guyton soils. Jena soils are coarse-loamy. Ouachita soils are brownish in the upper part of the subsoil. Libuse soils are higher on the landscape than the Guyton soils. They have a fragipan.

Typical pedon of Guyton silt loam, in an area of Guyton and Ouachita soils, frequently flooded; about 4 miles southeast of Olla, 0.5 mile south on Highway 127 from the Chickasaw Creek bridge, 2.3 miles east on oil field road, 1.1 miles south on oil field road to Tarver Creek, 200 feet east of road on trail, 130 feet north of trail; SE¼NW¼ sec. 8, T. 10 N., R. 3 E.

A—0 to 5 inches; dark brown (10YR 4/3) silt loam; many fine faint grayish brown (10YR 5/2) mottles; weak fine granular structure; very friable; many fine and medium roots; common fine and medium soft brown and black masses of iron and manganese oxide; strongly acid; clear smooth boundary.

Eg1—5 to 12 inches; grayish brown (10YR 5/2) silt loam; many fine faint brown (10YR 4/3) mottles; weak coarse subangular blocky structure; very friable; many fine and medium and common coarse roots; common fine and medium soft black and brown masses of iron and manganese oxide; very strongly acid; clear wavy boundary.

Eg2—12 to 19 inches; gray (10YR 6/1) silt loam; common fine and medium distinct brown (10YR 4/3) mottles; weak coarse subangular blocky structure; very friable; common fine, medium, and coarse roots; many fine and medium soft black and brown masses of iron and manganese oxide; very strongly acid; clear irregular boundary.

B/E—19 to 31 inches; gray (10YR 6/1) silt loam (Bt); common medium distinct yellowish brown (10YR 5/6) and few fine distinct brown (10YR 4/3) mottles; moderate coarse subangular blocky structure; friable; common fine and medium and few coarse roots; faint discontinuous dark gray (10YR 4/1) clay films on faces of peds; about 20 percent of the horizon occurring as tongues of light gray (10YR 7/1) silt loam (E); few old crawfish burrows filled with grayish brown (10YR 5/2) silt loam; common fine and medium soft black and brown masses; few black concretions of iron and manganese oxide; strongly acid; clear wavy boundary.

Btg1—31 to 40 inches; gray (10YR 5/1) silty clay loam; common fine and medium distinct yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; firm; few fine, medium, and coarse roots; faint discontinuous dark gray (10YR 4/1) clay films on faces of peds; few tongues and interfingers of light gray (10YR 6/1) silt loam; common fine and medium soft black and brown masses of iron and manganese oxide; few old crawfish burrows filled with grayish brown (10YR 5/2) silt loam; strongly acid; clear smooth boundary.

Btg2—40 to 50 inches; gray (10YR 6/1) silty clay loam; common fine and medium distinct yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; firm; few fine and medium roots; faint discontinuous dark gray (10YR 4/1) clay films on faces of peds; few tongues and interfingers of gray (10YR 6/1) silt loam; common fine and medium soft black and brown masses of iron and manganese oxide; very strongly acid; clear smooth boundary.

Btg3—50 to 62 inches; grayish brown (10YR 5/2) silt loam; many fine and medium distinct yellowish brown (10YR 5/4, 5/6) mottles; weak coarse subangular blocky structure; firm; few fine roots; faint discontinuous dark gray (10YR 4/1) clay films on faces of peds; few fine soft black and brown masses of iron and manganese oxide; extremely acid.

The solum is more than 50 inches thick. The content of exchangeable sodium ranges from 10 to 40 percent in the lower part of the solum. The effective cation-exchange capacity is 50 percent or more saturated with exchangeable aluminum to a depth of 30 inches or more.

The A horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 or 3. The number of faint mottles ranges from none to many. This horizon is 2 to 8 inches thick. It ranges from extremely acid to medium acid.

The Eg horizon and the E part of the B/E horizon have hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. They have few to many faint or distinct mottles in shades of brown or gray. They are silt loam or very fine sandy loam. They range from extremely acid to medium acid. Tongues of E material extend into the Btg horizon.

The Bt part of the B/E horizon and the Btg horizon have hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 or 2. They have few to many mottles in shades of brown or gray. They are silt loam or silty clay loam. They range from extremely acid to medium acid.

Some pedons have a BCg or Cg horizon. These horizons have the same range in color as the Btg horizon. They are silt loam, silty clay loam, clay loam, or sandy clay loam. The BCg horizon ranges from very strongly acid to medium acid, and the Cg horizon ranges from extremely acid to moderately alkaline.

Hollywood Series

The Hollywood series consists of moderately well drained, very slowly permeable soils that formed in clayey sediments of Tertiary age. These soils are on uplands. Slopes range from 1 to 5 percent.

The soils of the Hollywood series are fine, montmorillonitic, thermic Typic Pelluderts.

Hollywood soils commonly are near Bayoudan and Falkner soils. Bayoudan and Falkner soils are slightly higher on the landscape than the Hollywood soils. Also, Bayoudan soils are more acid throughout. Falkner soils are fine-silty.

Typical pedon of Hollywood clay, 1 to 5 percent slopes; in Tullos, 0.4 mile southwest on Highway 165 from its intersection with Highway 84 to oil field road, 300 feet north and 150 feet east on oil field road, 50 feet south of road; SW¼SW¼ sec. 25, T. 10 N., R. 1 E.

Ap—0 to 7 inches; very dark gray (10YR 3/1) clay; weak coarse subangular blocky structure parting to weak fine granular; very firm; common fine and medium and few coarse roots; slightly acid; clear wavy boundary.

A1—7 to 17 inches; black (10YR 2/1) clay; weak coarse subangular blocky structure; very firm; common fine and medium and few coarse roots; pressure faces on some peds; neutral; gradual smooth boundary.

A2—17 to 25 inches; black (10YR 2/1) clay; weak coarse subangular blocky structure parting to moderate medium subangular blocky; very firm; few fine and medium roots; common fine and few large intersecting slickensides; pressure faces on most peds; neutral; abrupt irregular boundary.

Bk1—25 to 32 inches; light olive brown (2.5Y 5/4) clay; many fine and medium faint olive yellow (2.5Y 6/6), many fine and medium faint light yellowish brown (2.5Y 6/4), and few fine faint gray mottles; weak coarse subangular blocky structure parting to strong fine and medium angular blocky; firm, sticky and very plastic; few fine roots; common fine and few large intersecting slickensides; pressure faces on most peds; common soft masses of calcium carbonate; few fine and medium concretions of calcium carbonate; moderately alkaline; gradual wavy boundary.

Bk2—32 to 50 inches; mottled light olive brown (2.5Y 5/4) and light brownish gray (2.5Y 6/2) clay; few fine faint gray mottles; weak coarse subangular blocky structure; firm, sticky and very plastic; few fine roots; common fine and few large intersecting slickensides; pressure faces on most peds; common soft masses of calcium carbonate; few fine and medium concretions of calcium carbonate; mildly alkaline; gradual smooth boundary.

Bk3—50 to 63 inches; mottled olive (5Y 4/2), light olive brown (2.5Y 5/4), and olive yellow (2.5Y 6/6) silty clay; common fine faint gray mottles; weak coarse subangular blocky structure; firm, sticky and very plastic; few fine roots; pressure faces on some peds; many soft masses of calcium carbonate; common fine and medium concretions of calcium carbonate; mildly alkaline.

The thickness of the A horizon ranges from 18 to 30 inches. The depth to secondary accumulations of calcium carbonate ranges from 25 to 35 inches.

The Ap, A1, and A2 horizons have value of 2 or 3 and chroma of 1. They are clay or silty clay. The Ap horizon is slightly acid or neutral, and the A1 and A2 horizons range from neutral to moderately alkaline.

The Bk horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 4, or it is mottled in shades of gray, brown, olive, or yellow. It ranges from neutral to moderately alkaline. In some pedons fossils of oysters and other shellfish are common in this horizon.

Jena Series

The Jena series consists of well drained, moderately permeable soils that formed in loamy and sandy recent alluvium. These soils are on flood plains. They are subject to flooding unless protected by levees. Slopes generally are less than 1 percent.

The soils of the Jena series are coarse-loamy, siliceous, thermic Fluventic Dystrochrepts.

Jena soils commonly are near Bienville, Cahaba, Guyton, and Ouachita soils. Bienville and Cahaba soils are on stream terraces. Bienville soils are sandy throughout, and Cahaba soils are fine-loamy. Guyton and Ouachita soils are fine-silty. Guyton soils are lower on the landscape than the Jena soils, and the well drained Ouachita soils are slightly lower.

Typical pedon of Jena very fine sandy loam, in an area of Ouachita and Jena soils, frequently flooded; about 1.25 miles west of Searcy, 2 miles west on Highway 500 from its junction with Highway 84, about 1 mile south on pipeline, 60 feet south of Funny Louis Bayou, 130 feet west of the center of pipeline; NE¼NE¼ sec. 10, T. 8 N., R. 2 E.

A—0 to 5 inches; dark grayish brown (10YR 4/2) very fine sandy loam; few fine faint dark yellowish brown mottles; weak medium subangular blocky structure parting to weak fine granular; very friable; many fine, medium, and coarse roots; very strongly acid; clear smooth boundary.

Bw1—5 to 20 inches; brown (10YR 4/3) silt loam; common fine faint brown spots; weak medium subangular blocky structure; very friable; many fine, medium, and coarse roots; slightly dark stains on faces of some peds; very strongly acid; clear smooth boundary.

Bw2—20 to 36 inches; brown (10YR 5/3) loam; weak medium subangular blocky structure; very friable; many fine and medium and common coarse roots; common fine pores; very strongly acid; clear smooth boundary.

Bw3—36 to 47 inches; brown (10YR 5/3) loam; common fine faint light yellowish brown mottles; weak medium subangular blocky structure; very friable; common fine, medium, and coarse roots; common fine pores; few small pockets of clean sand grains; very strongly acid; abrupt smooth boundary.

C1—47 to 60 inches; brown (10YR 5/3) loamy fine sand; light yellowish brown (10YR 6/4) streaks in root channels; few fine faint yellowish brown mottles; massive; very friable; few fine and medium roots; common fine pores; thin stratum of very pale brown fine sand; pockets of clean sand grains; very strongly acid; gradual smooth boundary.

C2—60 to 80 inches; light yellowish brown (10YR 6/4) loamy fine sand; few fine faint brown mottles; massive; very friable; few fine roots; very strongly acid.

The thickness of the solum ranges from 30 to 65 inches.

The A horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 4. It is 2 to 8 inches thick. It ranges from very strongly acid to medium acid.

The Bw horizon has hue of 10YR or 7.5YR, value of 4 to 7, and chroma of 3 to 6. It is silt loam, loam, very fine sandy loam, or sandy loam. It is very strongly acid or strongly acid.

The C horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6, or it is mottled in shades of gray to brown. It is fine sandy loam, sandy loam, or loamy fine sand. It is very strongly acid or strongly acid.

Keithville Series

The Keithville series consists of moderately well drained, very slowly permeable soils that formed in loamy sediments underlain by clayey sediments of Tertiary age. These soils are moderately slowly permeable in the upper part and very slowly permeable in the lower part. They are on uplands. Slopes range from 1 to 5 percent.

The soils of the Keithville series are fine-silty, siliceous, thermic Glossaquic Paleudalfs.

The Keithville soils in this parish are taxadjuncts because they have slightly more sand in the 2Bt horizon than is defined as the range for the series. This difference does not significantly affect the use and management of the soils.

Keithville soils are similar to Falkner and Tippah soils and commonly are near Malbis, Sacul, and Shatta soils. Falkner and Tippah soils are on uplands mantled by a thin layer of loess. They contain less sand throughout the solum than the Keithville soils. Malbis and Shatta soils are slightly higher on the landscape than the Keithville soils. They are loamy throughout. Sacul soils are on the lower slopes. They are clayey in the upper part of the subsoil.

Typical pedon of Keithville very fine sandy loam, 1 to 5 percent slopes; about 2 miles northeast of Olla, 1.3 miles northeast on Highway 165 from its intersection with Highway 124 to gravel road, 0.3 mile east on gravel road to abandoned house site, 600 feet north of center of road; SE¼NW¼ sec. 19, T. 11 N., R. 3 E.

Ap—0 to 3 inches; brown (10YR 5/3) very fine sandy loam; weak fine granular structure; very friable; many fine and medium roots; very strongly acid; clear smooth boundary.

E—3 to 7 inches; light yellowish brown (10YR 6/4) very fine sandy loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; very friable; many fine, medium, and coarse roots; extremely acid; clear smooth boundary.

BE—7 to 12 inches; yellowish brown (10YR 5/6) very fine sandy loam; few fine faint brown mottles; weak coarse subangular blocky structure; friable; common fine, medium, and coarse roots; extremely acid; clear smooth boundary.

Bt1—12 to 18 inches; strong brown (7.5YR 5/6) silty clay loam; common fine distinct yellowish brown (10YR 5/4) mottles; moderate medium subangular blocky structure; firm; common fine, medium, and coarse roots; faint discontinuous clay films on faces of peds; extremely acid; clear smooth boundary.

Bt2—18 to 25 inches; strong brown (7.5YR 5/6) silty clay loam; few fine prominent red (2.5YR 4/6), few fine distinct grayish brown (10YR 5/2), and common fine distinct yellowish red (5YR 5/6) mottles; moderate medium subangular blocky structure; firm; common fine and medium and few coarse roots; faint discontinuous clay films on faces of peds; few fine hard black and brown nodules of iron and manganese oxide; extremely acid; clear smooth boundary.

Bt3—25 to 32 inches; yellowish brown (10YR 5/6) silty

clay loam; common fine and medium prominent red (2.5YR 4/6) and many medium distinct light brownish gray (2.5Y 6/2) mottles; moderate medium subangular blocky structure; firm; few fine, medium, and coarse roots; faint discontinuous clay films on faces of peds; few patches of uncoated silt on faces of peds in the lower part; few fine hard black and brown nodules of iron and manganese oxide; extremely acid; clear wavy boundary.

Bt4—32 to 38 inches; mottled yellowish brown (10YR 5/6), light brownish gray (2.5Y 6/2), and red (2.5YR 4/6) silty clay loam (Bt); moderate fine and medium subangular blocky structure; firm; few fine and medium roots; thin coatings of silt or very fine sand (E) on faces of peds; faint discontinuous clay films on faces of peds; extremely acid; clear wavy boundary.

2Bt5—38 to 48 inches; grayish brown (2.5Y 5/2) sandy clay; common medium prominent strong brown (7.5YR 5/6) and yellowish brown (10YR 5/6, 5/4) mottles; moderate coarse subangular blocky structure; firm; few fine roots; faint discontinuous clay films on faces of peds; common pressure faces; few fine hard black and brown nodules of iron and manganese oxide; extremely acid; clear wavy boundary.

2Bt6—48 to 72 inches; mottled light brownish gray (2.5Y 6/2) and yellowish brown (10YR 5/6, 5/4) sandy clay; few fine prominent red (2.5YR 4/6) mottles; weak medium subangular blocky structure; firm; few fine roots; faint discontinuous clay films on faces of peds; common pressure faces; few fine hard black and brown nodules of iron and manganese oxide; very strongly acid.

The solum is more than 60 inches thick. It ranges from extremely acid to medium acid. Depth to the clayey 2Bt horizon ranges from 30 to 40 inches. The effective cation-exchange capacity is 50 percent or more saturated with exchangeable aluminum to a depth of 30 inches or more.

The Ap or A horizon has value of 3 to 5 and chroma of 2 to 4. It is 2 to 7 inches thick.

The E horizon has value of 5 or 6 and chroma of 3 or 4. It is very fine sandy loam or silt loam.

The BE horizon has value of 5 or 6 and chroma of 4 to 6. It is very fine sandy loam or silt loam.

The upper part of the Bt horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 6 to 8. The lower part has hue of 10YR, value of 5 or 6, and chroma of 6 to 8. This horizon is loam or silty clay loam.

The Bt part of the B/E horizon, if present, is mottled in hue of 2.5YR, 5Y, 7.5YR, and 10YR and value and chroma of 3 to 6. It is loam, clay loam, or silty clay loam. The E part is grayish silt or very fine sand.

The 2Bt horizon is mottled in shades of gray, red, or brown. It is sandy clay, clay, or silty clay.

Kisatchie Series

The Kisatchie series consists of well drained, very slowly permeable soils that are moderately deep to sandstone or siltstone bedrock. These soils formed in loamy and clayey sediments underlain by siltstone or sandstone of Tertiary age. They are on side slopes in the uplands. Slopes range from 8 to 40 percent.

The soils of the Kisatchie series are fine, montmorillonitic, thermic Typic Hapludalfs.

Kisatchie soils commonly are near Kurth, Oula, Providence, Ruston, and Smithdale soils. Kurth soils are on gently sloping ridgetops. They are fine-loamy. Oula soils are in landscape positions similar to those of the Kisatchie soils. They do not have bedrock within 40 inches of the surface. Providence and Ruston soils are on the higher ridgetops and side slopes. They are loamy throughout. Smithdale soils are on the lower side slopes. They are fine-loamy.

Typical pedon of Kisatchie fine sandy loam, in an area of Kisatchie-Oula complex, 8 to 40 percent slopes; about 3.5 miles northeast of Nickel, 2.2 miles north on Highway 503 from Highway 126, about 0.9 mile northeast to junction, 400 feet southwest on trail; NE¼NW¼ sec. 13, T. 10 N., R. 4 E.

A—0 to 7 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak coarse subangular blocky structure parting to weak fine granular; very friable; many fine and very fine roots; few fragments of sandstone and siltstone; very strongly acid; clear wavy boundary.

Bt1—7 to 12 inches; grayish brown (10YR 5/2) clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; firm; few fine, medium, and coarse roots; few fine and medium fragments of sandstone and siltstone; thin discontinuous clay films on faces of peds; extremely acid; clear wavy boundary.

Bt2—12 to 26 inches; grayish brown (10YR 5/2) silty clay; few fine and medium distinct yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; very firm; few fine, medium, and coarse roots; thin discontinuous clay films on faces of peds; common fragments of sandstone; extremely acid; clear wavy boundary.

2Cr—26 to 60 inches; olive gray (5Y 5/2), weathered and fractured sandstone.

The thickness of the solum and the depth to sandstone or siltstone bedrock range from 20 to 40

inches. The effective cation-exchange capacity is 20 to 50 percent saturated with exchangeable aluminum to a depth of 30 inches or more.

The A horizon has value of 2 to 4 and chroma of 1 or 2. It is 2 to 5 inches thick. It is very strongly acid or strongly acid.

Some pedons have an E horizon. This horizon has value of 4 to 6 and chroma of 1 or 2. It is silt loam or fine sandy loam. It ranges from 2 to 7 inches in thickness. It is very strongly acid or strongly acid.

The Bt horizon has hue of 10YR, 2.5Y, or 5Y, value of 5 or 6, and chroma of 2 to 6 or hue of 7.5YR, value of 5, and chroma of 2 to 4. This horizon is silty clay, silty clay loam, channery clay loam, or clay loam. It is extremely acid or very strongly acid. It has few or common fragments of sandstone or siltstone.

The 2Cr horizon is sandstone or siltstone.

Kurth Series

The Kurth series consists of moderately well drained, slowly permeable soils. These soils formed in a moderately thick layer of loamy coastal plain sediments of early Pleistocene age underlain by weakly cemented sandstone of Tertiary age. They are on uplands. Slopes range from 1 to 5 percent.

The soils of the Kurth series are fine-loamy, siliceous, thermic Aquic Glossudalfs.

The Kurth soils in this parish are taxadjuncts to the series because the Bt horizon above the Bt/E horizon does not have tongues of albic material. Also, the upper part of the solum is more acid than is defined as the range for the series. These differences do not significantly affect the use and management of the soils.

Kurth soils commonly are near Keithville, Kisatchie, Oula, Providence, Ruston, and Savannah soils. Keithville soils are in landscape positions similar to those of the Kurth soils. They do not have bedrock within 60 inches of the surface. Kisatchie and Oula soils are on the steeper side slopes. They have a clayey subsoil. Providence, Ruston, and Savannah soils are on the higher ridgetops. They are loamy throughout and do not have bedrock within 60 inches of the surface.

Typical pedon of Kurth fine sandy loam, 1 to 5 percent slopes; about 3 miles north of Jena, 4.2 miles north on Highway 127 from Highway 84 to Zeagler Nursery road, 150 feet north from road junction on Highway 127, about 70 feet west of fence line on west side of highway; NE¼NW¼ sec. 27, T. 9 N., R. 3 E.

A—0 to 6 inches; dark brown (10YR 4/3) fine sandy loam; weak fine granular structure; very friable; many fine, medium, and coarse roots; strongly acid; clear smooth boundary.

E—6 to 16 inches; brown (10YR 5/3) fine sandy loam; weak coarse subangular blocky structure parting to weak fine granular; very friable; many fine, medium, and coarse roots; strongly acid; clear irregular boundary.

Bt1—16 to 22 inches; yellowish brown (10YR 5/6) sandy clay loam; few fine distinct grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; friable; common fine, medium, and coarse roots; faint discontinuous clay films on faces of peds; very strongly acid; clear smooth boundary.

Bt2—22 to 27 inches; yellowish brown (10YR 5/6) sandy clay loam; common fine distinct grayish brown (10YR 5/2) and few fine prominent yellowish red (5YR 4/6) mottles; moderate medium subangular blocky structure; friable; common fine, medium, and coarse roots; faint discontinuous clay films on faces of peds; thin coatings of clean fine sand grains on faces of peds in the lower part; few fine soft brown nodules of iron and manganese oxide; very strongly acid; clear smooth boundary.

Bt/E1—27 to 38 inches; yellowish brown (10YR 5/6, 5/4) sandy clay loam (Bt); common fine distinct grayish brown (10YR 5/2) and dark brown (7.5YR 4/4) mottles; about 20 percent tongues and interfingers of light brownish gray (10YR 6/2) fine sandy loam (E); moderate medium prismatic structure parting to moderate medium subangular blocky; firm; common fine, medium, and coarse roots; faint discontinuous clay films on faces of peds; common patches of uncoated fine sand on faces of peds; common fine and medium soft brown nodules of iron and manganese oxide; strongly acid; clear irregular boundary.

Bt/E2—38 to 48 inches; mottled light brownish gray (10YR 6/2) and yellowish brown (10YR 5/6) clay loam (Bt); common fine and medium distinct dark brown (7.5YR 4/4) mottles; about 25 percent tongues and interfingers of gray (10YR 6/1) fine sandy loam (E); moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few fine, medium, and coarse roots; faint discontinuous clay films on faces of peds; common patches of uncoated fine sand on faces of peds; few soft brown nodules of iron and manganese oxide; strongly acid; clear irregular boundary.

Bt/E3—48 to 54 inches; mottled grayish brown (2.5Y 5/2) and yellowish brown (10YR 5/6, 5/4) sandy clay loam; weak coarse subangular blocky structure; very hard, very firm; few fine roots between peds; faint discontinuous clay films on faces of some peds; about 15 percent of the horizon occurring as tongues of gray (10YR 6/1) fine sandy loam (E);

strongly acid; clear wavy boundary.

Cr—54 to 60 inches; light brownish gray (2.5Y 6/2), weakly cemented sandstone; common fine prominent strong brown (7.5YR 5/6) and coarse prominent yellowish red (5YR 4/6) stains on horizontal surfaces; extremely hard; few fine roots in cracks; strongly acid.

The thickness of the solum ranges from 40 to 60 inches. The effective cation-exchange capacity is 50 percent or more saturated with exchangeable aluminum to a depth of 30 inches or more.

The A horizon has value of 3 to 5 and chroma of 2 or 3. It is 4 to 6 inches thick. It ranges from very strongly acid to medium acid.

The E horizon has value of 5 or 6 and chroma of 2 to 4. It ranges from very strongly acid to slightly acid.

The Bt horizon has hue of 2.5YR, 7.5YR, or 10YR, value of 4 or 5, and chroma of 4 to 6. It is loam, fine sandy loam, clay loam, or sandy clay loam. It ranges from very strongly acid to medium acid.

The Bt part of the Bt/E horizon has the same range in color as the Bt horizon, or it is mottled in shades of gray or brown. The tongues of E material have value of 5 or 6 and chroma of 1 or 2. This horizon is clay loam or sandy clay loam. It ranges from extremely acid to strongly acid.

The Cr horizon is weakly cemented sandstone that commonly has layers of siltstone, sand, or clay.

Lexington Series

The Lexington series consists of well drained soils that formed in a moderately thick mantle of loess and in the underlying loamy sediments of mid Pleistocene age. These soils are moderately permeable in the loess mantle and moderately rapidly permeable in the underlying loamy material. They are on uplands. Slopes range from 1 to 3 percent.

The soils of the Lexington series are fine-silty, mixed, thermic Typic Paleudalfs.

Lexington soils commonly are near Libuse, Providence, Ruston, and Smithdale soils. Libuse and Providence soils are in landscape positions similar to those of the Lexington soils. They have a fragipan. Ruston and Smithdale soils are on side slopes. They are fine-loamy.

Typical pedon of Lexington silt loam, 1 to 3 percent slopes; about 5 miles south of Nebo, 3.7 miles south on Highway 127 from its junction with Highway 460, about 1.4 miles south on Barge Landing road, 100 feet east of center of road; SE¼SW¼ sec. 33, T. 7 N., R. 3 E.

Ap1—0 to 4 inches; dark grayish brown (10YR 4/2) silt loam; weak medium subangular blocky structure parting to weak fine granular; friable; many fine and very fine roots; medium acid; clear wavy boundary.

Ap2—4 to 8 inches; dark brown (7.5YR 4/4) silt loam; weak medium subangular blocky structure parting to weak fine granular; friable; common fine and medium roots; strongly acid; clear wavy boundary.

BA—8 to 12 inches; reddish brown (5YR 4/4) silt loam; weak medium subangular blocky structure; friable; common fine, medium, and coarse roots; common small spots of dark brown (7.5YR 4/4) silt loam; strongly acid; clear smooth boundary.

Bt1—12 to 26 inches; yellowish red (5YR 4/6) silty clay loam; moderate medium subangular blocky structure; firm; common fine, medium, and coarse roots; faint discontinuous dark reddish brown (5YR 3/4) clay films on faces of peds; few fine black stains on faces of some peds; common black and opaque sand grains; strongly acid; clear smooth boundary.

Bt2—26 to 38 inches; yellowish red (5YR 4/6) silt loam; weak medium subangular blocky structure; friable; common fine, medium, and coarse roots; faint discontinuous dark reddish brown (5YR 3/4) clay films on faces of peds; common fine spots of strong brown (7.5YR 5/6) loam; common black stains on faces of some peds; common black and clear sand grains; strongly acid; clear smooth boundary.

2Bt3—38 to 55 inches; yellowish red (5YR 4/6) loam; weak coarse subangular blocky structure; friable; common fine and medium and few coarse roots; faint discontinuous dark reddish brown (5YR 3/4) clay films on faces of peds; common fine spots of strong brown (7.5YR 5/6) loam; black stains on faces of some peds; noticeable increase in content of sand; many fine black sand grains; few fine chert pebbles; strongly acid; clear smooth boundary.

2Bt4—55 to 71 inches; red (2.5YR 4/6) sandy loam; weak coarse subangular blocky structure; friable; few fine, medium, and coarse roots; faint discontinuous clay films on faces of peds; common patches of uncoated sand grains on faces of some peds; an increase in content of sand with increasing depth; few fine chert pebbles; strongly acid; gradual wavy boundary.

2Bt5—71 to 96 inches; red (2.5YR 4/6) sandy loam; weak coarse subangular blocky structure; friable; few fine roots; faint discontinuous clay films on faces of peds; common streaks and pockets of uncoated sand grains; few fine chert pebbles; strongly acid.

The solum is more than 60 inches thick. It ranges from very strongly acid to medium acid. The depth to a

horizon that contains more than 15 percent sand ranges from 25 to 40 inches.

The Ap or A horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 4. The Ap horizon is 5 to 8 inches thick.

The BA horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 4. It ranges from 3 to 6 inches in thickness. Some pedons do not have a BA horizon.

The Bt horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. It is silt loam or silty clay loam. The content of sand increases with increasing depth.

The 2Bt and 2BC horizons, if they occur, have the same range in color as the Bt horizon, or they have hue of 2.5YR, value of 4 or 5, and chroma of 6. They are loam or sandy loam.

Libuse Series

The Libuse series consists of moderately well drained soils that have a fragipan. These soils formed in loess of late Pleistocene age and in the underlying loamy coastal plain sediments of late or mid Pleistocene age. They are moderately permeable in the upper part of the subsoil and slowly permeable in the fragipan. They are on uplands. Slopes range from 1 to 5 percent.

The soils of the Libuse series are fine-silty, siliceous, thermic Typic Fragiudalfs.

Libuse soils commonly are near Gore, Providence, Tippah, and Vick soils. Gore soils are on side slopes. They have a clayey subsoil. Providence soils are at the higher elevations. They have mixed mineralogy. Tippah and Vick soils are in landscape positions similar to those of the Libuse soils. They do not have a fragipan.

Typical pedon of Libuse silt loam, 1 to 5 percent slopes; about 1 mile south of Rogers, 1.3 miles west on Highway 127 from its junction with Highway 776, about 0.7 mile southwest on gravel road, 170 feet north from center of road on trail, 42 feet east of trail; SE¼SW¼ sec. 1, T. 6 N., R. 2 E.

A—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam; weak medium subangular blocky structure parting to weak fine granular; very friable; many fine and medium and common coarse roots; strongly acid; clear smooth boundary.

E—6 to 12 inches; brown (10YR 5/3) silt loam; few fine faint dark yellowish brown mottles; weak coarse subangular blocky structure; very friable; common fine, medium, and coarse roots; few fine brown nodules of iron and manganese oxide; strongly acid; clear smooth boundary.

Bt1—12 to 22 inches; strong brown (7.5YR 5/6) silty clay loam; few fine distinct yellowish red (5YR 5/8) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; firm; common fine and medium and few coarse roots; faint discontinuous strong brown (7.5YR 4/6) clay films on faces of peds; few patches of uncoated silt on faces of peds; common worm casts; few fine soft brown nodules of iron and manganese oxide; very strongly acid; clear smooth boundary.

Bt2—22 to 27 inches; yellowish brown (10YR 5/6) silt loam; few fine distinct yellowish red (5YR 5/8) mottles; weak medium prismatic structure parting to moderate fine and medium subangular blocky; firm; slightly brittle; few fine, medium, and coarse roots; faint discontinuous strong brown (7.5YR 4/6) clay films on faces of peds; thin coatings of light yellowish brown (10YR 6/4) silt on faces of some peds; few fine soft brown and black nodules of iron and manganese oxide; very strongly acid; clear smooth boundary.

Btx1—27 to 38 inches; yellowish brown (10YR 5/6) silt loam; few medium prominent yellowish red (5YR 4/6) mottles; moderate very coarse prismatic structure parting to moderate medium platy; very firm; brittle in about 60 percent of the cross section; few fine roots in seams between prisms; faint discontinuous gray (10YR 5/1) clay films on faces of peds; grayish brown (10YR 5/2) silty clay loam in seams between prisms; few patches of uncoated silt on faces of peds; few fine brown and black nodules of iron and manganese oxide; very strongly acid; clear wavy boundary.

Btx2—38 to 52 inches; yellowish brown (10YR 5/8) silt loam; few fine prominent yellowish red (5YR 4/6) mottles; moderate very coarse prismatic structure; very firm; brittle in about 75 percent of the cross section; few very fine roots in seams between prisms; distinct continuous dark yellowish brown (10YR 4/6) clay films on faces of peds; light brownish gray (10YR 6/2) silty clay loam in seams between prisms; common patches of uncoated silt or very fine sand on faces of some peds; few fine brown and black nodules of iron and manganese oxide; very strongly acid; clear wavy boundary.

Btx3—52 to 73 inches; mottled yellowish brown (10YR 5/6, 5/4) and light brownish gray (10YR 6/2) silt loam; few fine distinct strong brown (7.5YR 4/6) mottles; weak very coarse prismatic structure; very firm; brittle; few very fine roots between peds; distinct continuous dark yellowish brown (10YR 4/4) clay films on faces of peds; few pockets and streaks of light yellowish brown (10YR 6/4) silt loam; common patches of uncoated silt or very fine sand on faces of peds; few fine spots of white,

noneffervescent salts; few fine brown nodules of iron and manganese oxide; very strongly acid; clear wavy boundary.

Btx4—73 to 83 inches; yellowish brown (10YR 5/4) silt loam; common fine and medium faint yellowish brown (10YR 5/6) and light brownish gray (10YR 6/2) mottles; few fine distinct strong brown (7.5YR 5/8) mottles; weak very coarse prismatic structure; very firm; brittle; distinct discontinuous grayish brown (10YR 5/2) clay films on faces of peds; few pockets and streaks of light yellowish brown (10YR 6/4) silt loam; common patches of uncoated silt or very fine sand on faces of peds; few spots of white, noneffervescent salts; few fine brown nodules of iron and manganese oxide; very strongly acid.

The solum is more than 60 inches thick. Depth to the fragipan ranges from 18 to 36 inches. The effective cation-exchange capacity is 50 percent or more saturated with exchangeable aluminum to a depth of 30 inches or more.

The A horizon has value of 3 to 5 and chroma of 2 or 3. It is 4 to 8 inches thick. It ranges from strongly acid to slightly acid.

The E horizon has value of 5 or 6 and chroma of 2 to 4. It is 2 to 6 inches thick. It ranges from strongly acid to slightly acid. Some pedons do not have an E horizon.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 8. It has few or common mottles in shades of red or brown. It is loam, silt loam, or silty clay loam. The content of sand increases with increasing depth. This horizon is very strongly acid or medium acid.

The Btx horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 8. It has few to many mottles in shades of red, gray, or brown. Seams between prisms are filled with grayish silt loam or silty clay loam. This horizon is silt loam, silty clay loam, or loam. It ranges from very strongly acid to medium acid.

Malbis Series

The Malbis series consists of moderately well drained, moderately slowly permeable soils that formed in loamy sediments, mainly of early Pleistocene age. These soils are on uplands. Slopes range from 1 to 5 percent.

The soils of the Malbis series are fine-loamy, siliceous, thermic Plinthic Paleudults.

Malbis soils commonly are near Keithville, Pheba, Ruston, and Savannah soils. Keithville soils are lower on the landscape than the Malbis soils. They have a clayey subsoil. Pheba soils are in nearly level areas. They have a fragipan. Ruston soils are slightly higher on the landscape than the Malbis soils. They do not have plinthite in the subsoil. Savannah soils are in landscape positions similar to those of the Malbis soils. They have a fragipan.

Typical pedon of Malbis fine sandy loam, 1 to 5 percent slopes; about 4 miles northeast of Summerville, 1.5 miles northeast on Highway 503 from its junction with Highway 127, about 1.2 miles north on improved parish road, 1.6 miles northeast on unimproved road, 320 feet west of road on woods trail, 20 feet north of trail; SE¼NW¼ sec. 35, T. 10 N., R. 3 E.

Ap—0 to 3 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak fine granular structure; very friable; many fine and very fine roots; medium acid; clear irregular boundary.

E—3 to 7 inches; brown (10YR 5/3) fine sandy loam; weak coarse subangular blocky structure; very friable; many fine and medium roots; few fine worm casts; medium acid; clear wavy boundary.

Bt1—7 to 15 inches; yellowish brown (10YR 5/8) loam; weak medium subangular blocky structure; friable; common fine, medium, and coarse roots; faint discontinuous clay films on faces of peds; few brown, black, and red nodules of iron and manganese oxide; very strongly acid; clear wavy boundary.

Bt2—15 to 21 inches; yellowish brown (10YR 5/6) sandy clay loam; few fine prominent red (2.5YR 4/6) mottles; moderate medium subangular blocky structure; friable; common fine, medium, and coarse roots; faint discontinuous clay films on faces of peds; few fine nodules of plinthite; few brown, black, and red nodules of iron and manganese oxide; very strongly acid; clear wavy boundary.

Bt3—21 to 30 inches; yellowish brown (10YR 5/6) clay loam; many fine and medium prominent red (2.5YR 4/6) and few fine faint brown mottles; moderate medium subangular blocky structure; friable; common fine, medium, and coarse roots; faint discontinuous clay films on faces of peds; few nodules of plinthite; few brown, black, and red nodules of iron and manganese oxide; very strongly acid; clear wavy boundary.

Btv1—30 to 45 inches; yellowish brown (10YR 5/6) sandy clay loam; many fine and medium prominent red (2.5YR 4/6) and common fine distinct light brownish gray (10YR 6/2) and pale brown (10YR 6/3) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; firm; slightly brittle; common fine and medium roots; faint discontinuous clay films on faces of peds; about 10 percent fine nodules of plinthite; few brown, black, and red nodules of iron and

manganese oxide; very strongly acid; clear wavy boundary.

Btv2—45 to 60 inches; mottled yellowish brown (10YR 5/6, 5/4) and light brownish gray (10YR 6/2) sandy clay loam; common fine prominent red (2.5YR 4/6) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; faint discontinuous clay films on faces of peds; few nodules of plinthite; few brown, black, and red nodules of iron and manganese oxide; very strongly acid; clear wavy boundary.

Btv3—60 to 72 inches; yellowish brown (10YR 5/6) sandy clay loam; common fine and medium distinct gray (10YR 6/1) and light brownish gray (10YR 6/2) and few fine prominent red (2.5YR 4/6) mottles; weak coarse prismatic structure; firm; faint discontinuous clay films on faces of peds; few fine nodules of plinthite; few brown, black, and red nodules of iron and manganese oxide; few fine streaks of opaque uncoated sand grains; very strongly acid.

The solum is more than 60 inches thick. The depth to a horizon that contains 5 percent or more plinthite ranges from 25 to 40 inches. The effective cation-exchange capacity is 50 percent or more saturated with exchangeable aluminum to a depth of 30 inches or more.

The A horizon has value of 3 to 5 and chroma of 2 or 3. It is 4 to 8 inches thick. It ranges from very strongly acid to medium acid.

The E horizon has value of 5 or 6 and chroma of 3 or 4. It ranges from very strongly acid to medium acid.

The Bt and Btv horizons have hue of 10YR or 7.5YR, value of 5, and chroma of 4 to 8. They are loam, clay loam, or sandy clay loam. They are very strongly acid or strongly acid. The content of plinthite nodules ranges from 1 to 25 percent in the Btv horizon.

Ouachita Series

The Ouachita series consists of well drained, moderately slowly permeable soils that formed in loamy alluvium. These soils are on flood plains and are subject to flooding. Slopes generally are less than 1 percent.

The soils of the Ouachita series are fine-silty, siliceous, thermic Fluventic Dystrochrepts.

Ouachita soils commonly are near Bienville, Cahaba, Guyton, and Jena soils. Bienville and Cahaba soils are on stream terraces. Bienville soils are sandy throughout. Cahaba soils are fine-loamy and have a reddish subsoil. Guyton soils are slightly lower on the flood plains than the Ouachita soils. They are grayish throughout. Jena soils are on the slightly higher natural levees. They are coarse-loamy.

Typical pedon of Ouachita silt loam, in an area of Ouachita and Jena soils, frequently flooded; about 1.25 miles west of Searcy, 2 miles west on Highway 500 from its junction with Highway 84, about 0.5 mile south on pipeline, 48 feet west of the center of pipeline right-of-way; SW¼SW¼ sec. 2, T. 8 N., R. 2 E.

Ap—0 to 6 inches; dark brown (10YR 4/3) silt loam; weak medium granular structure; very friable; many fine and very fine and few medium roots; very strongly acid; clear smooth boundary.

Bw1—6 to 14 inches; brown (10YR 5/3) silt loam; few fine faint dark yellowish brown (10YR 4/6) mottles; weak medium subangular blocky structure; very friable; many fine and medium and common coarse roots; common fine pores; few worm casts; very strongly acid; clear smooth boundary.

Bw2—14 to 26 inches; brown (10YR 5/3) silt loam; weak medium subangular blocky structure; very friable; common fine, medium, and coarse roots; many fine pores; few fine soft brown masses of iron and manganese oxide; very strongly acid; clear smooth boundary.

Bw3—26 to 50 inches; brown (10YR 5/3) silt loam; common fine faint light yellowish brown (10YR 6/4) and few fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few fine and medium roots; few fine pores; common fine soft dark brown masses of iron and manganese oxide; very strongly acid; clear smooth boundary.

C—50 to 60 inches; dark grayish brown (10YR 4/2) silt loam; few medium and coarse prominent strong brown (7.5YR 5/8) and common fine distinct light yellowish brown (10YR 6/4) mottles; weak coarse subangular blocky structure; friable; few fine roots; common fine pores; common fine soft black and brown masses of iron and manganese oxide; very strongly acid.

The thickness of the solum ranges from 40 to 80 inches. Reaction is very strongly acid or strongly acid throughout the profile. The effective cation-exchange capacity is 50 percent or more saturated with exchangeable aluminum to a depth of 30 inches or more.

The Ap horizon has value of 4 and chroma of 2 or 3 or value of 4 and chroma of 2. It ranges from 1 to 6 inches in thickness. It is silt loam or loam.

The Bw horizon has value of 4 or 5 and chroma of 3 to 6 or value of 4 and chroma of 2. It has few or common mottles in shades of brown. It is silt loam, loam, or silty clay loam.

The C horizon has the same range in color as the Bw horizon. It has few to many mottles in shades of brown or gray. It is silt loam, loam, very fine sandy loam, or loamy fine sand.

Oula Series

The Oula series consists of moderately well drained, very slowly permeable soils that formed in acid, clayey and loamy sediments of Tertiary age. These soils are on uplands. Slopes range from 5 to 30 percent.

The soils of the Oula series are fine, montmorillonitic, thermic Vertic Hapludalfs.

Oula soils commonly are near Bayoudan, Guyton, Kisatchie, Kurth, Providence, Ruston, and Smithdale soils. Bayoudan, Kisatchie, and Smithdale soils are in landscape positions similar to those of the Oula soils. Bayoudan soils have a solum that is thicker than that of the Oula soils. Kisatchie soils have bedrock at a depth of 20 to 40 inches. Smithdale soils are fine-loamy. Guyton soils are on flood plains along small streams. They are fine-silty. Kurth soils are on ridgetops and the upper side slopes. They have a loamy solum and are underlain by sandstone bedrock. Providence and Ruston soils are on the higher ridgetops. They are loamy throughout.

Typical pedon of Oula very fine sandy loam, in an area of Kisatchie-Oula complex, 8 to 40 percent slopes; about 10 miles northeast of Jena, 2.2 miles north on Highway 503 from its junction with Highway 126, about 0.9 mile east on gravel road, 0.2 mile south on gravel road, 23 feet east in a clear-cut area; SW¼NE¼ sec. 14, T. 10 N., R. 4 E.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) very fine sandy loam; weak fine granular structure; very friable; common fine and medium roots; very strongly acid; clear wavy boundary.

Bt1—7 to 15 inches; grayish brown (10YR 5/2) clay; common medium distinct dark yellowish brown (10YR 4/6), brown (7.5YR 4/4), and strong brown (7.5YR 4/6) and few fine and medium prominent yellowish red (5YR 4/6) mottles; moderate coarse subangular blocky structure; firm; common fine, medium, and coarse roots; faint continuous clay films on faces of peds; extremely acid; clear wavy boundary.

Bt2—15 to 24 inches; grayish brown (2.5Y 5/2) clay; common medium distinct strong brown (7.5YR 4/6) and yellowish brown (10YR 5/6, 5/8) mottles; moderate coarse subangular blocky structure; firm; few fine, medium, and coarse roots; faint continuous clay films on faces of peds; extremely acid; clear wavy boundary.

Bt3—24 to 40 inches; grayish brown (2.5Y 5/2) clay; common fine and medium distinct yellowish brown (10YR 5/6, 5/8) mottles; few fine prominent strong brown (7.5YR 5/6) mottles; weak coarse subangular blocky structure; very firm; few fine, medium, and coarse roots; faint continuous clay films on faces of peds; extremely acid; clear wavy boundary.

Bt4—40 to 58 inches; grayish brown (2.5Y 5/2) clay; few fine distinct yellowish brown (10YR 5/6, 5/8) and few fine prominent strong brown (7.5YR 5/6) mottles; weak coarse subangular blocky structure; very firm; few fine roots; few nearly horizontal to nearly vertical slickensides; faint discontinuous clay films on faces of peds; extremely acid; clear wavy boundary.

C—58 to 72 inches; stratified, light brownish gray (2.5Y 6/2) sandy clay loam and clay; few fine faint light yellowish brown and gray and few fine distinct yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; very firm; few very fine roots; common fine and medium fragments of sandstone; some rock structure; extremely acid.

The thickness of the solum ranges from 25 to more than 60 inches. Some pedons are underlain by siltstone or sandstone bedrock at a depth of more than 60 inches. The effective cation-exchange capacity is 50 percent or more saturated with exchangeable aluminum to a depth of 30 inches or more.

The Ap horizon has value of 3 or 4 and chroma of 2 or 3. It is 5 to 9 inches thick. It ranges from extremely acid to medium acid. It is fine sandy loam or very fine sandy loam.

Some pedons have an E horizon. This horizon has value of 4 to 6 and chroma of 2 to 4. It is silt loam, very fine sandy loam, or fine sandy loam. It ranges from extremely acid to medium acid.

The Bt horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2 to 4 or hue of 7.5YR, value of 4 or 5, and chroma of 4 to 6. It is clay or silty clay. It ranges from extremely acid to strongly acid. The number of siltstone or sandstone fragments ranges from none to common.

The C horizon has the same range in color as the Bt horizon. It ranges from clay to sandy clay loam and is commonly stratified. It ranges from extremely acid to strongly acid. The number of siltstone or sandstone fragments ranges from none to common.

Pheba Series

The Pheba series consists of somewhat poorly drained soils that have a fragipan. These soils are moderately permeable in the upper part of the subsoil

and moderately slowly permeable in the fragipan. They formed in loamy sediments of late or mid Pleistocene age. They are on uplands. Slopes range from 0 to 2 percent.

The soils of the Pheba series are coarse-silty, siliceous, thermic Glossaquic Fragiudults.

Pheba soils are similar to Frizzell soils and commonly are near Guyton, Malbis, and Savannah soils. Frizzell soils are on low stream terraces. They do not have a fragipan. The poorly drained Guyton soils are in depressions and drainageways. They are grayish throughout and are fine-silty. Malbis and Savannah soils are in the slightly higher, more convex positions. They are fine-loamy.

Typical pedon of Pheba loam; about 2 miles south of Little Creek, 1.2 miles southwest on improved road from Highway 500 at Little Creek to Ebenezer Church, 0.35 mile south to road junction, 1.4 mile south and east on gravel road, 240 feet north of road; NE¼NE¼ sec. 7, T. 8 N., R. 2 E.

A—0 to 4 inches; dark grayish brown (10YR 4/2) loam; weak fine granular structure and some thin platy structure parting to weak fine granular; very friable; common fine and very fine roots; very few charcoal particles; common fine black nodules of iron and manganese oxide; very strongly acid; clear smooth boundary.

E—4 to 8 inches; grayish brown (10YR 5/2) loam; weak coarse subangular blocky structure; very friable; common fine and very fine roots; common fine black masses of iron and manganese oxide; few charcoal particles; very strongly acid; clear smooth boundary.

Bw—8 to 13 inches; yellowish brown (10YR 5/4) loam; few fine distinct dark yellowish brown (10YR 4/6) mottles; weak coarse subangular blocky structure; very friable; common fine and medium and few coarse roots; common fine soft black masses and concretions of iron and manganese oxide; very strongly acid; clear irregular boundary.

E/B—13 to 19 inches; light brownish gray (10YR 6/2) very fine sandy loam (E); few fine distinct yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; very friable; common fine and medium and few coarse roots; many fine interstitial pores; light yellowish brown (10YR 6/4) loam (Bt) in about 30 percent of the cross section; faint discontinuous clay films on peds in the Bt part; common fine soft black masses and concretions of iron and manganese oxide; strongly acid; clear irregular boundary.

Btnx1—19 to 29 inches; yellowish brown (10YR 5/4) loam; common fine and medium faint grayish brown (10YR 5/2) and brown (10YR 5/3) mottles; moderate coarse prismatic structure; firm; brittle in about 75 percent of the cross section; few fine and medium roots between prisms; faint nearly continuous dark grayish brown (10YR 4/2) clay films on faces of peds and in pores; light brownish gray (10YR 6/2) fine sand and silt between prisms; common fine soft black masses and concretions of iron and manganese oxide; strongly acid; clear wavy boundary.

Btnx2—29 to 38 inches; brown (10YR 5/3) loam; common fine and medium distinct yellowish brown (10YR 5/6) and grayish brown (10YR 5/2) mottles; moderate very coarse prismatic structure; firm; brittle in about 80 percent of the cross section; few fine and very fine roots between prisms; faint discontinuous dark grayish brown (10YR 4/2) clay films on faces of peds; light brownish gray (10YR 6/2) fine sand and silt in seams between prisms; common fine soft black masses and concretions of iron and manganese oxide; strongly acid; clear wavy boundary.

Btnx3—38 to 45 inches; brown (10YR 5/3) loam; common fine and medium yellowish brown (10YR 5/6) mottles; weak very coarse prismatic structure; firm; brittle in about 60 percent of the cross section; few fine and very fine roots; faint discontinuous clay films on faces of peds; light brownish gray (10YR 6/2) fine sand and silt in seams between prisms; few fine soft black masses and concretions of iron and manganese oxide; strongly acid; clear wavy boundary.

Btnx4—45 to 56 inches; mottled brown (10YR 5/3) and yellowish brown (10YR 5/6) loam; few fine and medium faint grayish brown (10YR 5/2) mottles; weak very coarse prismatic structure; firm; brittle in about 60 percent of the cross section; faint discontinuous clay films on faces of peds; few fine soft black masses and concretions of iron and manganese oxide; strongly acid; gradual wavy boundary.

Btnx5—56 to 75 inches; mottled yellowish brown (10YR 5/6, 5/4) and brown (10YR 5/3) loam; weak very coarse prismatic structure; firm; brittle; faint discontinuous clay films on faces of peds; common small pockets of light brownish gray (10YR 6/2) silt and fine sand; few fine soft black masses and concretions of iron and manganese oxide; strongly acid.

The solum is more than 60 inches thick. It ranges from extremely acid to strongly acid. Depth to the fragipan ranges from 14 to 30 inches. The effective cation-exchange capacity is 50 percent or more

saturated with exchangeable aluminum to a depth of 30 inches or more.

The A horizon has value of 3 or 4 and chroma of 2 or 3. It is 2 to 6 inches thick.

The E horizon and the E part of the E/B horizon have hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 4. They are silt loam, loam, very fine sandy loam, or fine sandy loam. The E horizon is 4 to 6 inches thick.

The Bw horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 to 6. It has few or common mottles in shades of brown. It is silt loam or loam.

The Btnx horizon and Bt part of the E/B horizon have hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 to 6, or they are mottled in shades of brown, yellow, or gray. They are loam, silt loam, or silty clay loam.

Providence Series

The Providence series consists of moderately well drained soils that have a fragipan. These soils are moderately permeable above the fragipan and moderately slowly permeable in the fragipan. They formed in loess of late Pleistocene age and in the underlying loamy sediments of mid Pleistocene to Tertiary age. They are on uplands. Slopes range from 1 to 8 percent.

The soils of the Providence series are fine-silty, mixed, thermic Typic Fragiudalfs.

Providence soils commonly are near Guyton, Kisatchie, Kurth, Lexington, Libuse, Ruston, Smithdale, and Tippah soils. The poorly drained Guyton soils are in drainageways, on flats, or in depressional areas. They are grayish throughout. Kisatchie soils are on the lower side slopes. They are moderately deep over bedrock. Kurth and Tippah soils are at the lower elevations. Kurth soils are underlain by bedrock, and Tippah soils are clayey in the lower part of the subsoil. Lexington, Libuse, and Ruston soils are in landscape positions similar to those of the Providence soils. Lexington and Ruston soils do not have a fragipan. Libuse soils have siliceous mineralogy. Smithdale soils are on the lower side slopes. They do not have a fragipan.

Typical pedon of Providence silt loam, 1 to 3 percent slopes; about 5.5 miles northeast of Jena on Highway 459, about 0.2 mile east from Highway 459 on gravel road to road junction, 0.3 mile south on gravel road, 90 feet northeast from center of road; SW¼NW¼ sec. 26, T. 9 N., R. 4 E.

Ap1—0 to 4 inches; very dark grayish brown (10YR 3/2) silt loam; weak fine granular structure; very friable; common fine and very fine roots; slightly acid; clear smooth boundary.

Ap2—4 to 8 inches; dark grayish brown (10YR 4/2) silt loam; weak medium subangular blocky structure; very friable; common fine and very fine and few medium roots; strongly acid; clear smooth boundary.

Bt1—8 to 18 inches; yellowish red (5YR 4/6) silty clay loam; weak medium subangular blocky structure; friable; common fine, medium, and coarse roots; faint discontinuous clay films on faces of peds; few fine spots of strong brown (7.5YR 4/6) silt loam; strongly acid; clear smooth boundary.

Bt2—18 to 25 inches; strong brown (7.5YR 4/6) silt loam; moderate medium subangular blocky structure; friable; common fine, medium, and coarse roots; faint discontinuous clay films on faces of peds; few dark brown and black stains on faces of some peds; few fine black nodules of iron and manganese oxide; strongly acid; clear wavy boundary.

Bt3—25 to 31 inches; brown (7.5YR 5/4) silt loam; few fine distinct light brownish gray (10YR 6/2) mottles; weak fine prismatic structure parting to moderate fine and medium subangular blocky; slightly brittle; common fine, medium, and coarse roots; faint discontinuous clay films on faces of peds; faint discontinuous coatings of light yellowish brown (10YR 6/4) silt on faces of some peds; many fine and medium hard black and brown nodules of iron and manganese oxide; common black stains on faces of some peds; strongly acid; clear wavy boundary.

Btx1—31 to 39 inches; dark brown (7.5YR 4/4) silt loam; few fine distinct light brownish gray (10YR 6/2) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; firm; brittle; few fine roots along faces of prisms; faint discontinuous clay films on vertical faces of some peds; thin coatings of grayish brown silt on faces of peds; light brownish gray (10YR 6/2) silt loam in seams between prisms; an increase in content of sand with increasing depth; strongly acid; clear smooth boundary.

Btx2—39 to 47 inches; dark brown (7.5YR 4/4) silt loam; few fine distinct light brownish gray (10YR 6/2) mottles; weak very coarse prismatic structure; very firm; brittle; few fine roots in seams; faint discontinuous clay films on vertical faces of some peds; few patches of uncoated sand and silt on faces of some peds; light brownish gray (10YR 6/2) silt loam in seams between prisms; strongly acid; clear smooth boundary.

2Btx3—47 to 61 inches; strong brown (7.5YR 4/6) loam; few fine distinct light brownish gray (10YR 6/2) mottles; weak very coarse prismatic structure; very firm; brittle; few fine roots in seams; faint

discontinuous clay films on faces of peds; light brownish gray (10YR 6/2) silt loam in seams between prisms; very strongly acid; clear smooth boundary.

2Btx4—61 to 71 inches; strong brown (7.5YR 4/6) loam; few medium distinct grayish brown (10YR 5/2) mottles; weak very coarse prismatic structure; very firm; brittle; faint discontinuous clay films on faces of peds; few thin seams of light yellowish brown (10YR 6/4) sandy loam between prisms; strongly acid; clear smooth boundary.

2Btx5—71 to 82 inches; strong brown (7.5YR 5/6) sandy loam; few fine distinct grayish brown (10YR 5/2) mottles; weak very coarse prismatic structure; very firm; brittle; faint discontinuous clay films on faces of peds; few streaks of uncoated sand grains; few black stains on faces of some peds; strongly acid.

The solum is more than 60 inches thick. Depth to the fragipan ranges from 18 to 38 inches. Except for the surface layer in areas that have been limed, reaction ranges from very strongly acid to medium acid throughout the profile. The effective cation-exchange capacity is 20 to 50 percent saturated with exchangeable aluminum to a depth of 30 inches or more.

The Ap or A horizon has value of 3 or 4 and chroma of 2 or 3. It is 4 to 9 inches thick.

Some pedons have an E horizon. This horizon has value of 4 to 6 and chroma of 2 to 4. It is 4 to 7 inches thick.

Some pedons have a BE horizon. This horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 8. It is silt loam or silty clay loam.

The Bt and Btx horizons have hue of 5YR, 7.5YR, or 10YR, value of 4 or 5, and chroma of 4 to 6. Few to many mottles in shades of brown, gray, or red are in the lower part of the Bt horizon and in the Btx horizon. These horizons are silt loam or silty clay loam. The content of sand increases with increasing depth.

The 2Btx horizon is red to gray. It is clay loam, loam, sandy clay loam, or sandy loam.

Ruston Series

The Ruston series consists of well drained, moderately permeable soils that formed in loamy stream sediments, mainly of early Pleistocene age. These soils are mainly on uplands. Slopes range from 1 to 8 percent.

The soils of the Ruston series are fine-loamy, siliceous, thermic Typic Paleudults.

Ruston soils are similar to Cahaba soils and commonly are near Lexington, Malbis, Providence, and Smithdale soils. Cahaba soils are on low stream terraces. Their solum is less than 60 inches thick. Lexington soils are slightly higher on the landscape than the Ruston soils. They are fine-silty. Malbis soils are on the less convex slopes. They are brownish throughout and contain plinthite. Providence soils are in landscape positions similar to those of the Ruston soils. They have a fragipan. Smithdale soils are on the steeper side slopes. They do not have a bisequum.

Typical pedon of Ruston fine sandy loam, 3 to 8 percent slopes; about 4 miles northeast of Jena, 5.8 miles northeast on Highway 459 from its junction with Highway 84, about 2.1 miles southeast on gravel road to pipeline, 165 feet northeast on pipeline from center of road, 50 feet southeast of center of pipeline corridor; SE¼NE¼ sec. 34, T. 9 N., R. 4 E.

A—0 to 6 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak coarse subangular blocky structure parting to weak fine granular; very friable; many fine and medium and common coarse roots; common fine spots of brown fine sandy loam; few fine chert pebbles; strongly acid; clear smooth boundary.

E—6 to 12 inches; brown (10YR 5/3) fine sandy loam; weak coarse subangular blocky structure; very friable; common fine, medium, and coarse roots; few fine chert pebbles; few fine strong brown spots in the lower part; strongly acid; clear wavy boundary.

Bt1—12 to 24 inches; red (2.5YR 4/6) sandy clay loam; moderate medium subangular blocky structure; firm; common fine, medium, and coarse roots; faint nearly continuous clay films on faces of peds; few fine chert pebbles; very strongly acid; clear wavy boundary.

Bt2—24 to 40 inches; red (2.5YR 4/8) sandy clay loam; few medium distinct strong brown (7.5YR 5/6) and few fine prominent pale brown (10YR 6/3) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; firm; common fine and medium and few coarse roots; faint discontinuous reddish brown (2.5YR 4/4) clay films on faces of peds; few fine chert pebbles; few streaks of very pale brown (10YR 7/4) fine sand; very strongly acid; clear wavy boundary.

B/E—40 to 52 inches; red (2.5YR 5/8) fine sandy loam (Bt); weak coarse prismatic structure parting to weak medium subangular blocky; friable; few fine and medium roots; faint discontinuous reddish brown (2.5YR 4/4) clay films on faces of peds; about 20 percent of the horizon occurring as pockets and streaks of pale brown (10YR 6/3)

loamy sand (E); few patches of clean sand on faces of some peds; few fine chert pebbles; very strongly acid; clear irregular boundary.

B′t—52 to 75 inches; red (2.5YR 5/8) sandy clay loam; few fine and medium prominent light brownish gray (10YR 6/2) mottles that are round or cylindrical, have a gray center and strong brown edges, and are oriented vertically, horizontally, and diagonally; weak very coarse prismatic structure; friable; slightly brittle; faint discontinuous reddish brown (2.5YR 4/4) clay films on faces of peds; few streaks of pale brown (10YR 6/3) fine sand; very strongly acid.

The solum is more than 60 inches thick. Except for the surface layer in areas that have been limed, reaction ranges from very strongly acid to medium acid throughout the profile. The effective cation-exchange capacity is 50 percent or more saturated with exchangeable aluminum to a depth of 30 inches or more.

The A or Ap horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 or 3. It is 3 to 6 inches thick.

The E horizon has value of 5 or 6 and chroma of 2 to 4. It is fine sandy loam, sandy loam, or loamy sand. Some pedons have a thin BE horizon.

The Bt and B′t horizons have hue of 5YR or 2.5YR, value of 4 to 6, and chroma of 4 to 8. They are sandy clay loam, clay loam, loam, or fine sandy loam. The content of clay decreases from the upper part of the Bt horizon to the B/E horizon and increases in the B′t horizon.

The E part of the B/E horizon has hue of 10YR, value of 5 or 6, and chroma of 3 or 4. It occurs as streaks and pockets of fine sandy loam, loamy sand, or sandy loam. It has quartz gravel or ironstone fragments in some pedons.

Sacul Series

The Sacul series consists of moderately well drained, slowly permeable soils that formed in acid, loamy and clayey marine sediments of Tertiary age. These soils are on uplands. Slopes range from 1 to 20 percent.

The soils of the Sacul series are clayey, mixed, thermic Aquic Hapludults.

Sacul soils are similar to Smithdale soils and commonly are near Guyton, Keithville, Malbis, and Ruston soils. Smithdale soils are on side slopes. They are fine-loamy. The poorly drained Guyton soils are in drainageways. They are fine-silty and are grayish throughout. Keithville soils are on ridgetops and the upper side slopes. They are loamy in the upper part of the subsoil. Malbis and Ruston soils are on the higher parts of ridges. They are fine-loamy.

Typical pedon of Sacul fine sandy loam, 5 to 20 percent slopes; about 1 mile northwest of Olla, 2.2 miles north on Highway 127 from its junction with Highway 125, about 1.6 miles south and west on improved road to logging trail, 300 feet east on trail, 75 feet south from center of trail; SE¼SE¼ sec. 21, T. 11 N., R. 2 E.

Ap—0 to 4 inches; grayish brown (10YR 5/2) fine sandy loam; weak fine granular structure; very friable; many very fine, fine, and medium roots; few fine spots of yellowish brown (10YR 5/4) fine sandy loam in the lower part; common fine and medium rounded ironstone pebbles; very strongly acid; clear smooth boundary.

Bt1—4 to 11 inches; yellowish red (5YR 4/6) clay; few fine distinct brown (10YR 5/3) mottles; weak medium subangular blocky structure; firm; common fine and medium and few coarse roots; distinct nearly continuous clay films on faces of peds; few spots of very dark grayish brown (10YR 3/2) fine sandy loam in the upper part; few fine and medium rounded ironstone pebbles; extremely acid; clear smooth boundary.

Bt2—11 to 20 inches; yellowish red (5YR 5/6) clay; few fine prominent grayish brown (2.5Y 5/2) and common fine distinct red (2.5YR 4/6) mottles; moderate medium subangular blocky structure; firm; common fine, medium, and coarse roots; distinct nearly continuous clay films on faces of peds; few fine and medium rounded ironstone pebbles; extremely acid; clear wavy boundary.

Bt3—20 to 37 inches; yellowish red (5YR 5/6) clay; common fine and medium prominent light brownish gray (2.5Y 6/2) and few fine and medium distinct red (2.5YR 4/6) mottles; moderate medium subangular blocky structure; firm; common fine and medium and few coarse roots; distinct nearly continuous clay films on faces of peds; few fine and medium rounded ironstone pebbles; extremely acid; clear wavy boundary.

Bt4—37 to 51 inches; mottled yellowish brown (10YR 5/6, 5/4) and light brownish gray (2.5Y 6/2) clay loam; weak coarse subangular blocky structure; firm; few fine and very fine roots; distinct discontinuous clay films on faces of some peds; few fine and medium rounded ironstone pebbles; extremely acid; gradual wavy boundary.

C—51 to 68 inches; stratified light brownish gray (2.5Y 6/2) sandy clay loam and yellowish brown (10YR 5/6) sandy loam; common fine distinct strong brown (7.5YR 5/8) and few fine distinct yellowish red (5YR 5/6) mottles; massive; friable; few fine and very fine roots; extremely acid.

The thickness of the solum ranges from 40 to more than 60 inches. The effective cation-exchange capacity is 50 percent or more saturated with exchangeable aluminum to a depth of 30 inches or more.

The A horizon has value of 3 or 4 and chroma of 2 or 3. The Ap horizon has value of 5 and chroma of 2 or 3. It is 1 to 4 inches thick. Reaction is very strongly acid or strongly acid.

Some pedons have an E horizon. This horizon has value of 4 to 6 and chroma of 3 or 4. It is fine sandy loam or sandy loam. It is 4 to 10 inches thick. It is very strongly acid or strongly acid.

The upper part of the Bt horizon has hue of 5YR, value of 4 or 5, and chroma of 6 to 8 or hue of 2.5YR, value of 3, and chroma of 6 to 8. The next part has the same range in color and has mottles in shades of gray. It is clay or silty clay. The lower part is mottled in shades of brown, red, or gray. It is clay loam, silty clay loam, or sandy clay loam. This horizon ranges from extremely acid to strongly acid.

Some pedons have a BC horizon. This horizon is mottled in the same colors as those in the lower part of the Bt horizon. Also, it has the same textures.

The C horizon is red, yellow, or gray and is stratified. It is clay loam, sandy clay loam, or sandy loam. It ranges from extremely acid to strongly acid. Some pedons do not have a C horizon.

Savannah Series

The Savannah series consists of moderately well drained soils that have a fragipan. These soils are moderately permeable in the upper part and moderately slowly permeable in the fragipan. They formed in loamy fluvial sediments of mid Pleistocene age. They are on uplands. Slopes range from 1 to 5 percent.

The soils of the Savannah series are fine-loamy, siliceous, thermic Typic Fragiudults.

Savannah soils are similar to Shatta soils and commonly are near Malbis, Pheba, and Ruston soils. Shatta and Malbis soils are in landscape positions similar to those of the Savannah soils. Shatta soils have less sand throughout the solum than the Savannah soils. Malbis soils do not have a fragipan. The somewhat poorly drained Pheba soils are in nearly level areas. They are coarse-silty. Ruston soils are on the more convex slopes. They do not have a fragipan.

Typical pedon of Savannah fine sandy loam, 1 to 5 percent slopes; about 4 miles southwest of Little Creek, 1.2 miles southwest on improved road from Highway 500 at Little Creek to Ebenezer Church, 2.5 miles south on gravel road, 0.45 mile southwest on logging trail, 30 feet south of center of trail; SE¼NW¼ sec. 13, T. 8 N., R. 1 E.

A—0 to 5 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak medium and fine subangular blocky structure parting to weak fine granular; very friable; many fine and very fine and few medium roots; common fine spots of yellowish brown (10YR 5/6) fine sandy loam; few fine charcoal fragments; few fine chert pebbles; very strongly acid; clear smooth boundary.

E—5 to 10 inches; light yellowish brown (10YR 6/4) fine sandy loam; weak coarse subangular blocky structure; very friable; common fine and very fine and few medium and coarse roots; few fine bodies of pale brown (10YR 6/3) fine sandy loam; few fine charcoal fragments; few fine chert pebbles; very strongly acid; clear wavy boundary.

BE—10 to 13 inches; yellowish brown (10YR 5/6) fine sandy loam; common fine and medium pale brown (10YR 6/3) spots of fine sandy loam; weak medium subangular blocky structure; very friable; common fine and very fine and few medium and coarse roots; few fine nodules of iron and manganese oxide; few fine chert pebbles; few fine charcoal fragments; extremely acid; gradual wavy boundary.

Bt1—13 to 24 inches; yellowish brown (10YR 5/6) loam; few fine distinct strong brown (7.5YR 4/6) mottles; moderate medium subangular blocky structure; friable; few fine, medium, and coarse roots; faint discontinuous clay films on faces of some peds; few fine brown nodules of iron and manganese oxide; few fine chert pebbles; large krotovina of dark gray (10YR 4/1) fine sandy loam; extremely acid; clear wavy boundary.

Bt2—24 to 30 inches; yellowish brown (10YR 5/4) loam; common medium faint yellowish brown (10YR 5/6, 5/8) and few fine faint grayish brown mottles; weak medium subangular blocky structure; firm; slightly brittle in about 20 percent of the volume; few fine, medium, and coarse roots; faint discontinuous clay films on faces of some peds; coatings of very fine sand about 1 millimeter thick on faces of some peds; common fine and medium brown nodules of iron and manganese oxide; few fine chert pebbles; large krotovina of dark gray (10YR 4/1) fine sandy loam; extremely acid; clear smooth boundary.

Btx1—30 to 46 inches; mottled yellowish brown (10YR 5/6, 5/4), strong brown (7.5YR 5/6), and light brownish gray (10YR 6/2) sandy clay loam; moderate very coarse prismatic structure parting to moderate coarse subangular blocky; firm; brittle in about 70 percent of the volume; few fine roots in seams between prisms; faint discontinuous clay films on faces of peds; sand grains coated and bridged with clay; seams of gray (10YR 6/1) sandy clay loam about 1 to 2 centimeters thick between

prisms; common fine chert pebbles; common fine and medium brown nodules of iron and manganese oxide; extremely acid; clear wavy boundary.

Btx2—46 to 65 inches; mottled yellowish brown (10YR 5/4, 5/6), light brownish gray (10YR 6/2), and strong brown (7.5YR 5/8) loam; weak very coarse prismatic structure parting to weak medium subangular blocky; firm; brittle in about 60 percent of the volume; faint discontinuous clay films on faces of peds; seams of gray (10YR 6/1) clay loam about 1 to 2 centimeters thick between prisms; common fine brown nodules of iron and manganese oxide; common fine chert pebbles; extremely acid.

The solum is more than 60 inches thick. Depth to the fragipan ranges from 20 to 38 inches. Reaction ranges from extremely acid to strongly acid throughout the profile. The effective cation-exchange capacity is 50 percent or more saturated with exchangeable aluminum to a depth of 30 inches or more.

The A horizon has value of 4 or 5 and chroma of 2 or 3. It is 5 to 8 inches thick.

The E horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 or 4. It is 2 to 6 inches thick. Some pedons do not have an E horizon.

The BE horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. It is fine sandy loam or loam.

The Bt horizon has hue of 7.5YR or 10YR, value of 5, and chroma of 4 to 8. It has few or common mottles in shades of brown throughout. The lower part also has few or common mottles in shades of gray. This horizon is sandy clay loam, clay loam, or loam.

The Btx horizon is mottled in shades of yellow, brown, red, or gray. It is sandy clay loam, clay loam, or loam.

Sharkey Series

The Sharkey series consists of poorly drained, very slowly permeable soils that formed in clayey and loamy alluvium. These soils are on broad flats and in depressions on flood plains. They are subject to flooding unless protected by levees. Slopes are generally less than 1 percent.

The soils of the Sharkey series are very fine, montmorillonitic, nonacid, thermic Vertic Haplaquepts.

The Sharkey soils in this parish are taxadjuncts because reaction in the A and Bg1 horizons is slightly lower than is defined as the range for the series. This difference does not significantly affect the use and management of the soils.

Sharkey soils commonly are near Alligator, Dundee, Fausse, and Tensas soils. Alligator and Tensas soils are slightly higher on the landscape than the Sharkey soils. Also, Alligator soils are more acid in the subsoil. Tensas soils are loamy at a depth of 20 to 36 inches. Dundee soils are higher on the landscape than the Sharkey soils. They are loamy throughout. Fausse soils are lower on the landscape than the Sharkey soils. They do not dry enough to crack.

Typical pedon of Sharkey clay, frequently flooded; about 9 miles southeast of Jena, in the Catahoula National Wildlife Refuge, 1.2 miles southwest from the refuge headquarters on gravel road to Cowpen Bayou, 1 mile south on gravel road, 500 feet east of road on woods trail, 20 feet south of trail; SE¼NE¼ sec. 26, T. 7 N., R. 4 E.

A—0 to 5 inches; dark gray (10YR 4/1) clay; few fine and medium prominent strong brown (7.5YR 5/6) mottles; weak fine granular structure; very firm, plastic; common fine and medium roots; very strongly acid; clear smooth boundary.

Bg1—5 to 12 inches; dark gray (10YR 4/1) clay; common fine and medium prominent strong brown (7.5YR 5/6) and dark brown (7.5YR 4/4) mottles; moderate medium subangular blocky structure; very firm, plastic; common fine and medium and few coarse roots; shiny faces on some peds; some material from the A horizon in cracks; very strongly acid; clear wavy boundary.

Bg2—12 to 22 inches; dark gray (5Y 4/1) clay; few fine and medium prominent dark brown (7.5YR 4/4) and strong brown (7.5YR 5/6) mottles; moderate medium angular blocky structure; very firm, very plastic; common fine and medium and few coarse roots; shiny faces on some peds; few black stains on faces of some peds; some material from the A horizon in cracks; slightly acid; clear wavy boundary.

Bg3—22 to 44 inches; gray (5Y 5/1) clay; common fine prominent dark yellowish brown (10YR 4/4) and few fine prominent strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; very firm, very plastic; few fine, medium, and coarse roots; common medium slickensides that do not intersect; few fine masses of calcium carbonate; mildly alkaline; clear wavy boundary.

Bg4—44 to 54 inches; gray (5Y 5/1) clay; common fine and medium prominent dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; firm, very plastic; few fine and very fine roots; few slickensides that do not intersect; few fine dark brown nodules of iron and manganese oxide; mildly alkaline; abrupt wavy boundary.

Cg—54 to 80 inches; stratified dark gray (10YR 4/1) silty clay loam and gray (10YR 5/1) silt loam; many

fine and medium distinct brown (10YR 5/3) and yellowish brown (10YR 5/6) mottles; massive; thinly bedded; friable; few fine dark brown nodules of iron and manganese oxide; moderately alkaline.

The thickness of the solum ranges from 36 to 60 inches. Cracks, 1 to 3 centimeters wide, form to a depth of 20 to 24 inches in most years.

The A horizon has value of 3 or 4 and chroma of 1 or 2. It is 4 to 15 inches thick. It is less than 10 inches thick in pedons that have value of 3. This horizon ranges from very strongly acid to medium acid.

The Bg horizon has hue of 10YR or 5Y, value of 4 to 6, and chroma of 1. It has few to many mottles in shades of brown, yellow, or red. It ranges from very strongly acid to moderately alkaline.

The Cg horizon has colors similar to those of the Bg horizon. It is dominantly silt loam or silty clay loam, but in some pedons it is silty clay or clay below a depth of 40 inches. This horizon ranges from neutral to moderately alkaline. The number of accumulations of calcium carbonate ranges from none to common.

Shatta Series

The Shatta series consists of moderately well drained soils that have a fragipan. These soils are moderately permeable in the upper part and slowly permeable in the fragipan. They formed in loamy sediments of late or mid Pleistocene age. They are on uplands. Slopes range from 1 to 5 percent.

The soils of the Shatta series are fine-silty, siliceous, thermic Typic Fragiudults.

The Shatta soils in this parish are taxadjuncts to the series because the base saturation 30 inches below the top of the fragipan is slightly more than 35 percent. Also, the content of organic matter in the A horizon is slightly higher than is defined as the range for the series. These differences do not significantly affect the use and management of the soils.

Shatta soils are similar to Libuse and Savannah soils and commonly are near Keithville and Malbis soils. Libuse and Savannah soils are in landscape positions similar to those of the Shatta soils. Libuse soils have a base saturation of 35 percent or more, and Savannah soils have more sand throughout the solum than the Shatta soils. Keithville soils are on the lower slopes. They are clayey in the lower part of the subsoil. Malbis soils are on the slightly higher ridges. They do not have a fragipan.

Typical pedon of Shatta very fine sandy loam, 1 to 5 percent slopes; about 2 miles northeast of Urania, 2.3 miles southwest on Highway 165 from its intersection with Highway 127, about 1 mile north on blacktop road, 100 feet west of center of road; NE¼NE¼ sec. 4, T. 10 N., R. 2 E.

A—0 to 3 inches; very dark grayish brown (10YR 3/2) very fine sandy loam; weak fine granular structure; very friable; many fine, medium, and coarse roots; medium acid; clear smooth boundary.

E—3 to 7 inches; brown (10YR 5/3) very fine sandy loam; weak coarse subangular blocky structure; very friable; many fine, medium, and coarse roots; common fine spots of very dark grayish brown (10YR 3/2) very fine sandy loam; medium acid; clear smooth boundary.

BE—7 to 10 inches; yellowish brown (10YR 5/4) silt loam; weak coarse subangular blocky structure; very friable; many fine, medium, and coarse roots; few fine soft brown masses of iron and manganese oxide; very strongly acid; clear wavy boundary.

Bt1—10 to 17 inches; yellowish brown (10YR 5/6) silt loam; weak medium subangular blocky structure; friable; common fine, medium, and coarse roots; faint discontinuous clay films on faces of peds; few rounded and oblong brittle bodies with yellowish red (5YR 5/6) interiors; very strongly acid; clear smooth boundary.

Bt2—17 to 26 inches; yellowish brown (10YR 5/6) silt loam; weak coarse prismatic structure parting to moderate medium subangular blocky; friable; common fine, medium, and coarse roots; faint discontinuous clay films on faces of peds; few very thin silt coatings on vertical faces of peds; few fine black stains on faces of some peds; common round and oblong brittle bodies with yellowish red (5YR 5/6) interiors; few krotovinas of pale brown (10YR 6/3) very fine sandy loam; very strongly acid; clear wavy boundary.

Btx1—26 to 41 inches; yellowish brown (10YR 5/6) loam; few fine prominent red (2.5YR 4/6) mottles; grayish brown (10YR 5/2) loam in seams 1 to 2 centimeters thick between prisms; moderate very coarse prismatic structure; very firm; very brittle in about 80 percent of the cross section; common fine and medium roots in seams between prisms; many fine vesicular pores; faint discontinuous strong brown (7.5YR 4/6) clay films on faces of peds; common round and oblong brittle bodies with yellowish red interiors; few fine black stains on faces of some peds; few krotovinas of pale brown (10YR 6/3) very fine sandy loam; very strongly acid; gradual smooth boundary.

Btx2—41 to 58 inches; yellowish brown (10YR 5/6) loam; few fine prominent red (2.5YR 5/6) and common fine faint yellowish brown (10YR 5/4) mottles; grayish brown (10YR 5/2) clay loam in

seams 1 to 2 centimeters thick between prisms; moderate very coarse prismatic structure; very firm; very brittle in about 60 percent of the cross section; few fine roots in seams; faint discontinuous strong brown (7.5YR 4/6) clay films on faces of peds; common round and oblong brittle bodies with yellowish red interiors; few fine black stains on faces of some peds; very strongly acid; gradual smooth boundary.

Btx3—58 to 70 inches; yellowish brown (10YR 5/6) sandy clay loam; few fine prominent red (2.5YR 4/6) and common medium faint dark yellowish brown (10YR 4/6) mottles; grayish brown (10YR 5/2) clay loam in seams 1 to 2 centimeters thick between prisms; weak coarse prismatic structure; firm; very brittle in about 30 percent of the cross section; few very fine roots in seams; faint discontinuous strong brown (7.5YR 4/6) clay films on faces of some peds; very strongly acid.

The solum is more than 60 inches thick. It is very strongly acid to medium acid. Depth to the fragipan ranges from 20 to 36 inches. The effective cation-exchange capacity is 50 percent or more saturated with exchangeable aluminum to a depth of 30 inches or more.

The A horizon has value of 3 or 4 and chroma of 2 or 3. It is 3 to 8 inches thick.

The E horizon has value of 5 or 6 and chroma of 2 or 3. It is 2 to 6 inches thick. It is silt loam, loam, or very fine sandy loam.

The BE horizon has value of 5 and chroma of 4 to 6. It is silt loam or loam.

The Bt horizon has value of 5 and chroma of 4 to 8. It is silt loam, loam, clay loam, or silty clay loam. The number of mottles and stains in shades of red or brown ranges from none to common.

The Btx horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 4 to 8. It is mottled in shades of brown, yellow, red, or gray in the lower part. This horizon is loam, clay loam, silt loam, or silty clay loam.

The BC horizon, if it occurs, has the same range in color as the Btx horizon. It has few to many mottles in shades of red, brown, or gray. It is very fine sandy loam, fine sandy loam, loam, or sandy clay loam.

Smithdale Series

The Smithdale series consists of well drained, moderately permeable soils that formed in loamy sediments, mainly of early Pleistocene age. These soils are on side slopes in the uplands. Slopes range from 12 to 30 percent.

The soils of the Smithdale series are fine-loamy, siliceous, thermic Typic Hapludults.

Smithdale soils are similar to Cahaba soils and commonly are near Guyton, Kisatchie, Oula, Providence, and Ruston soils. Cahaba soils are on low stream terraces. Their solum is less than 60 inches thick. The poorly drained Guyton soils are in drainageways. They are fine-silty and are grayish throughout. Kisatchie and Oula soils are on the lower side slopes. They have a clayey subsoil. Providence and Ruston soils are on ridgetops and the upper side slopes. Providence soils are fine-silty and have a fragipan. Ruston soils have a subsoil that has a bisequum.

Typical pedon of Smithdale fine sandy loam, 12 to 30 percent slopes; about 4 miles northeast of Jena, 5.8 miles northeast on Highway 459 from its junction with Highway 84, about 2.1 miles southeast on gravel road, 0.25 mile north of road on pipeline, 75 feet northwest of center of pipeline; NE¼NE¼ sec. 34, T. 9 N., R. 4 E.

A—0 to 7 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; very friable; many fine and medium roots; strongly acid; clear smooth boundary.

E—7 to 11 inches; brown (10YR 5/3) fine sandy loam; weak medium subangular blocky structure; very friable; common medium and coarse roots; very strongly acid; clear smooth boundary.

Bt1—11 to 21 inches; red (2.5YR 4/8) sandy clay loam; moderate medium subangular blocky structure; firm; common medium and coarse roots; faint nearly continuous clay films on faces of peds; very strongly acid; gradual smooth boundary.

Bt2—21 to 34 inches; red (2.5YR 4/8) sandy clay loam; weak medium subangular blocky structure; friable; few medium and coarse roots; faint nearly continuous clay films on faces of peds; few fine quartz pebbles; few pockets of strong brown (7.5YR 5/8) fine sandy loam; very strongly acid; clear wavy boundary.

Bt3—34 to 63 inches; red (2.5YR 4/8) sandy loam; weak coarse subangular blocky structure parting to weak medium subangular blocky; friable; slightly brittle; very few medium and coarse roots; sand grains coated and bridged with clay and oxides; few fine quartz pebbles; common pockets of strong brown (7.5YR 5/8) sand grains; very strongly acid; gradual smooth boundary.

Bt4—63 to 85 inches; yellowish red (5YR 5/8) sandy loam; many fine and medium distinct strong brown (7.5YR 5/8) mottles; weak very coarse subangular blocky structure; very friable; few fine roots; sand

grains coated and bridged with clay and oxides; few fine quartz pebbles; common pockets of pale brown (10YR 6/3) sand grains; many black and colorless sand grains; very strongly acid.

The solum is more than 60 inches thick. It is very strongly acid or strongly acid. The effective cation-exchange capacity is 50 percent or more saturated with exchangeable aluminum to a depth of 30 inches or more.

The A horizon has value of 3 or 4 and chroma of 2 or 3. It is 3 to 10 inches thick. It is less than 5 inches thick in pedons that have value of 3.

The E horizon has value of 5 or 6 and chroma of 2 to 4. It is fine sandy loam, sandy loam, loamy fine sand, or loamy sand.

The upper part of the Bt horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 to 8. It is clay loam, sandy clay loam, or loam. The lower part has the same range in color as the upper part, but it has few to many pockets of pale brown or strong brown sand grains. It is loam or sandy loam.

Tensas Series

The Tensas series consists of somewhat poorly drained soils that formed in clayey and loamy alluvium. These soils are very slowly permeable in the upper part and moderately slowly permeable in the lower part. They are on natural levees of distributaries along the Mississippi River. They are subject to flooding unless protected by the levees. Slopes generally are less than 1 percent.

The soils of the Tensas series are fine, montmorillonitic, thermic Aeric Ochraqualfs.

Tensas soils are similar to Forestdale soils and commonly are near Alligator, Dundee, Fausse, and Sharkey soils. The poorly drained Forestdale soils are lower on the landscape than the Tensas soils. Also, they are grayer throughout. The poorly drained Alligator and Sharkey and somewhat poorly drained Dundee soils are slightly lower on the landscape than the Tensas soils. Alligator and Sharkey soils are clayey throughout. Dundee soils are fine-silty. The very poorly drained Fausse soils are in depressions. They are clayey throughout and do not have an argillic horizon.

Typical pedon of Tensas silty clay, occasionally flooded; about 8 miles southeast of Jena, in the Catahoula National Wildlife Refuge, 1.2 miles southwest from the refuge headquarters on gravel road to Cowpen Bayou, 0.4 mile northwest on gravel road, 35 feet north of road; SW¼NE¼ sec. 23, T. 7 N., R. 4 E.

A—0 to 4 inches; dark gray (10YR 4/1) silty clay; few fine prominent strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure parting to weak fine granular; very firm; common fine and very fine roots; very strongly acid; clear smooth boundary.

Btg1—4 to 14 inches; grayish brown (10YR 5/2) clay; common fine and medium prominent strong brown (7.5YR 5/8) mottles; strong medium subangular blocky structure; very firm; common fine, medium, and coarse roots; faint nearly continuous dark grayish brown (10YR 4/2) clay films on faces of peds; very strongly acid; clear wavy boundary.

Btg2—14 to 25 inches; grayish brown (2.5Y 5/2) clay; many fine and medium prominent strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; very firm; common fine and medium and few coarse roots; faint nearly continuous dark grayish brown (10YR 4/2) clay films on faces of peds; very strongly acid; clear wavy boundary.

Btg3—25 to 33 inches; dark grayish brown (2.5Y 4/2) silty clay; many fine prominent dark brown (7.5YR 4/4) and strong brown (7.5YR 4/6) mottles; moderate medium subangular blocky structure; very firm; common fine and medium and few coarse roots; faint dark gray (10YR 4/1) clay films on faces of peds; strongly acid; abrupt wavy boundary.

2Btg4—33 to 44 inches; grayish brown (2.5Y 5/2) loam; common fine prominent yellowish brown (10YR 5/6) and dark yellowish brown (10YR 4/6) mottles; weak medium subangular blocky structure; friable; few fine, medium, and coarse roots; faint discontinuous dark gray (10YR 4/1) clay films on faces of some peds; few fine soft brown and black masses of iron and manganese oxide; medium acid; clear wavy boundary.

2Btg5—44 to 61 inches; grayish brown (10YR 5/2) loam; common fine and medium distinct dark brown (7.5YR 4/4) and yellowish brown (10YR 5/4, 5/6) mottles; weak coarse subangular blocky structure; friable; few fine and very fine roots; faint discontinuous gray (10YR 5/1) clay films on faces of peds; few fine soft brown and black masses of iron and manganese oxide; medium acid; clear wavy boundary.

2C—61 to 88 inches; grayish brown (10YR 5/2) very fine sandy loam; common fine and medium dark yellowish brown (10YR 4/6) mottles; massive; friable; few fine and very fine roots; few fine soft brown and black masses of iron and manganese oxide; neutral.

The thickness of the solum ranges from 30 to 80 inches. Depth to the loamy 2Btg horizon is 20 to 36 inches.

The A horizon has value of 4 or 5 and chroma of 1 or 2. It is 3 to 8 inches thick. It ranges from very strongly acid to medium acid.

The Btg horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 or 2. It is clay or silty clay. It ranges from very strongly acid to medium acid.

The 2Btg and 2C horizons have hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 or 3. They are silty clay loam, silt loam, very fine sandy loam, or loam. They range from strongly acid to neutral.

Tippah Series

The Tippah series consists of moderately well drained soils that formed in loess of late Pleistocene age and in the underlying clayey sediments of Tertiary age. These soils are moderately permeable in the upper part and slowly permeable in the lower part. They are on uplands. Slopes range from 1 to 5 percent.

The soils of the Tippah series are fine-silty, mixed, thermic Aquic Paleudalfs.

Tippah soils are similar to Keithville soils and commonly are near Bayoudan, Gore, Falkner, and Vick soils. Keithville soils are in landscape positions similar to those of the Tippah soils. Their subsurface layer tongues into the underlying subsoil. Bayoudan and Gore soils are at the lower elevations. They are clayey throughout the subsoil. The somewhat poorly drained Falkner and Vick soils are on the more nearly level, less convex slopes. Falkner soils do not have grayish mottles within 30 inches of the surface. Vick soils have a subsurface layer that tongues into the underlying subsoil.

Typical pedon of Tippah silt loam, 1 to 5 percent slopes; about 6 miles northeast of Summerville, 3.5 miles north on Highway 127 from its intersection with Highway 503 to gravel road, 6.5 miles northeast on gravel road to intersection, 2.8 miles southeast on gravel road, 96 feet east of road ditch; NW¼SW¼ sec. 20, T. 10 N., R. 4 E.

Ap—0 to 5 inches; yellowish brown (10YR 5/4) silt loam; weak fine granular structure; very friable; many fine and very fine roots; very strongly acid; clear smooth boundary.

Bt1—5 to 12 inches; strong brown (7.5YR 5/6) silt loam; few fine distinct light yellowish brown (10YR 6/4) mottles; weak medium subangular blocky structure; friable; many fine, medium, and coarse roots; faint discontinuous clay films on faces of peds; few chipped pebbles (artifacts); very strongly acid; gradual smooth boundary.

Bt2—12 to 18 inches; yellowish red (5YR 5/6) silt loam; weak medium subangular blocky structure; friable; many fine, medium, and coarse roots; faint discontinuous clay films on faces of peds; few chipped pebbles (artifacts); very strongly acid; clear smooth boundary.

Bt3—18 to 24 inches; strong brown (7.5YR 5/6) silt loam; few fine distinct light brownish gray (10YR 6/2), few fine prominent yellowish red (5YR 4/6), and common fine distinct light yellowish brown (10YR 6/4) mottles; moderate medium subangular blocky structure; friable; common fine, medium, and coarse roots; faint discontinuous clay films on faces of peds; few thin coatings of silt or very fine sand on faces of some peds; common fine and medium brown and black nodules of iron and manganese oxide; few chipped pebbles (artifacts); very strongly acid; clear wavy boundary.

2Bt4—24 to 31 inches; mottled yellowish brown (10YR 5/6), light brownish gray (10YR 6/2), and red (2.5YR 4/8) silty clay; moderate medium subangular blocky structure; very firm; common fine, medium, and coarse roots; common pressure faces; faint discontinuous clay films on faces of peds; few fine brown and black nodules of iron and manganese oxide; few thin silt coatings on faces of peds in the upper part; very strongly acid; clear smooth boundary.

2Bt5—31 to 41 inches; mottled light brownish gray (10YR 6/2), yellowish brown (10YR 5/6, 5/4), and red (2.5YR 4/8) silty clay; moderate coarse subangular blocky structure; very firm; few fine, medium, and coarse roots; common pressure faces; faint discontinuous clay films on faces of peds; very strongly acid; clear smooth boundary.

2Bt6—41 to 49 inches; mottled light brownish gray (2.5Y 6/2) and yellowish brown (10YR 5/6) silty clay; few fine and medium prominent red (2.5YR 4/8) mottles; moderate coarse subangular blocky structure; very firm; few fine and medium roots; common pressure faces; faint discontinuous clay films on faces of peds; very strongly acid; clear smooth boundary.

2Bt7—49 to 58 inches; mottled light brownish gray (2.5Y 6/2) and light yellowish brown (2.5Y 6/4) silty clay; few fine prominent red (2.5YR 4/8) mottles; weak very coarse subangular blocky structure; very firm; few fine and very fine roots; common pressure faces; faint discontinuous clay films on faces of peds; very strongly acid; clear smooth boundary.

2Bt8—58 to 63 inches; light brownish gray (2.5Y 6/2) silty clay; common medium and coarse prominent yellowish brown (10YR 5/6) and strong brown (7.5YR 5/6) mottles; weak very coarse subangular blocky structure; very firm; few very fine roots; common pressure faces; faint discontinuous clay

films on faces of peds; very strongly acid; clear smooth boundary.

2BC—63 to 70 inches; pale olive (5Y 6/3) silty clay; common medium and coarse prominent strong brown (7.5YR 5/8) mottles; weak thick platy structure parting to moderate medium subangular blocky; very firm; thin strata of silt loam with many very fine shiny flakes; common spots of white salts 2 millimeters to 2 centimeters in diameter; very strongly acid.

The solum is more than 60 inches thick. It ranges from very strongly acid to medium acid. Depth to the clayey 2Bt horizon ranges from 15 to 35 inches.

The Ap or A horizon has value of 4 to 6 and chroma of 2 to 4. It is 3 to 8 inches thick.

Some pedons have a thin E horizon. This horizon has hue of 10YR, value of 5 or 6, and chroma of 2 to 6.

The Bt horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. It is silt loam or silty clay loam. This horizon has 20 to 35 percent clay in the upper 20 inches.

The 2Bt and 2BC horizons have a matrix ranging from red to gray, or they are mottled in shades of red, gray, brown, or yellow. They are clay, silty clay, silty clay loam, or clay loam.

Una Series

The Una series consists of poorly drained, very slowly permeable soils that formed in loamy and clayey alluvium. These soils are on flood plains along the major streams. They are subject to flooding unless protected by levees. Slopes generally are less than 1 percent.

The soils of the Una series are fine, mixed, acid, thermic Typic Haplaquepts.

Una soils are similar to Alligator and Sharkey soils and commonly are near Bienville, Cahaba, Fausse, Guyton, and Zenoria soils. Alligator and Sharkey soils are in landscape positions similar to those of the Una soils. They are finer textured than the Una soils. Bienville and Cahaba soils are on low stream terraces. Bienville soils are sandy throughout. Cahaba soils are fine-loamy. Fausse soils are in depressions and are wetter than the Una soils. They have a very fine textured control section. Guyton soils are in narrow drainageways. They are fine-silty. Zenoria soils are higher on the landscape than the Una soils. They are fine-loamy.

Typical pedon of Una silty clay loam, frequently flooded; about 3.5 miles south of Rogers, 0.5 mile west on Highway 127 from its intersection with Highway 776 to gravel road, 3.6 miles southwest on gravel road to pipeline, 0.7 mile south on pipeline, 132 feet west of center of pipeline; NW¼SW¼ sec. 23, T. 6 N., R. 2 E.

A1—0 to 2 inches; very dark grayish brown (10YR 3/2) silty clay loam; weak coarse subangular blocky structure parting to weak fine granular; firm; common fine and very fine roots; ½ inch of decomposing leaf litter at the surface; very strongly acid; clear smooth boundary.

A2—2 to 6 inches; dark grayish brown (10YR 4/2) silty clay loam; common fine and medium distinct strong brown (7.5YR 4/6) mottles; weak medium subangular blocky structure; very firm; common fine and medium roots; very strongly acid; clear smooth boundary.

Bg1—6 to 25 inches; dark gray (10YR 4/1) silty clay; common fine and medium distinct strong brown (7.5YR 4/6) and few fine distinct light olive brown (2.5Y 5/6) mottles; moderate medium subangular blocky structure; very firm; common fine and medium roots; shiny ped faces; thin layer of black organic material at the top of the horizon; very strongly acid; clear smooth boundary.

Bg2—25 to 36 inches; gray (10YR 5/1) silty clay; common fine and medium distinct strong brown (7.5YR 5/6) and few fine distinct light olive brown (2.5Y 5/6) mottles; moderate medium subangular blocky structure; very firm; few fine and medium roots; shiny ped faces; few slickensides; few fine black stains; very strongly acid; clear smooth boundary.

Bg3—36 to 61 inches; light brownish gray (2.5Y 6/2) silty clay; many medium and coarse prominent strong brown (7.5YR 5/6, 4/6) and common fine and medium distinct light olive brown (2.5Y 5/4) mottles; weak medium subangular blocky structure; very firm; few fine roots; shiny ped faces; few slickensides; few fine black stains; very strongly acid; clear smooth boundary.

Bg4—61 to 78 inches; light brownish gray (2.5Y 6/2) silty clay loam; common fine and medium prominent strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; firm; very strongly acid.

The solum is more than 60 inches thick. It is very strongly acid or strongly acid. The effective cation-exchange capacity is 50 percent or more saturated with exchangeable aluminum to a depth of 30 inches or more.

The A horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 1 or 2. It is 4 to 6 inches thick.

The Bg horizon has hue of 10YR, 2.5Y, or 5Y. It has

value of 4 or 5 and chroma of 1 or value of 6 and chroma of 1 or 2. It is mottled in shades of brown or yellow. It is silty clay loam, silty clay, or clay.

Vick Series

The Vick series consists of somewhat poorly drained, slowly permeable soils that formed in a thin mantle of loess and in the underlying loamy and clayey sediments of late or mid Pleistocene age. These soils are on uplands. Slopes range from 0 to 2 percent.

The soils of the Vick series are fine-silty, siliceous, thermic Glossaquic Hapludalfs.

The Vick soils in this parish are taxadjuncts to the series because they do not have a Bt horizon between the BE and B/E horizons. This difference does not significantly affect the use and management of the soils.

Vick soils are similar to Falkner soils and commonly are near Gore, Guyton, Libuse, and Tippah soils. Falkner and Libuse soils are at the higher elevations on uplands. Falkner soils have a thick, clayey subsoil. Libuse soils have a fragipan. Gore soils are on side slopes. They have a fine textured control section. Guyton soils are in depressions and drainageways. They are grayish throughout. Tippah soils are on the more convex slopes. Their subsoil does not decrease in content of clay within 60 inches of the surface.

Typical pedon of Vick silt loam; 1.3 miles southeast of Rogers, 0.5 mile west on Highway 127 from its junction with Highway 776, about 0.4 mile southwest on gravel road, 225 feet northwest from center of road; SE¼SW¼ sec. 6, T. 6 N., R. 3 E.

A—0 to 4 inches; brown (10YR 5/3) silt loam; weak coarse subangular blocky structure parting to weak fine granular; very friable; many fine and few medium and coarse roots; few fine soft black masses of iron and manganese oxide; few charcoal fragments; very strongly acid; clear smooth boundary.

BE—4 to 12 inches; yellowish brown (10YR 5/4) silt loam; few fine distinct yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; very friable; many fine and common medium and coarse roots; many very fine tubular pores; few fine spots of yellowish brown (10YR 5/4) silt loam; common fine soft black masses of iron and manganese oxide; few charcoal fragments; very strongly acid; gradual smooth boundary.

B/E—12 to 25 inches; yellowish brown (10YR 5/4) silt loam (Bt); common fine distinct yellowish brown (10YR 5/6) and light brownish gray (10YR 6/2) mottles; weak coarse subangular blocky structure; very friable; common fine, medium, and coarse roots; distinct discontinuous clay films on faces of some peds; common spots and streaks of light yellowish brown (10YR 6/4) and light gray (10YR 7/2) silt (E); common krotovinas of grayish brown (10YR 5/2) silt; common fine soft black masses of iron and manganese oxide; very strongly acid; clear smooth boundary.

2Bt1—25 to 35 inches; mottled yellowish brown (10YR 5/6) and grayish brown (10YR 5/2) silty clay; few fine distinct yellowish red (5YR 5/6) mottles; moderate coarse subangular blocky structure; very firm; few fine and very fine roots; distinct nearly continuous clay films on faces of peds; few thin silt coatings on faces of peds in the upper part; common krotovinas of grayish brown (10YR 5/2) silt; common fine soft black and brown masses of iron and manganese oxide; very strongly acid; clear wavy boundary.

2Bt2—35 to 46 inches; mottled light yellowish brown (10YR 6/4), olive yellow (2.5Y 6/6), and light brownish gray (10YR 6/2) silty clay loam; few fine distinct yellowish red (5YR 5/6) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; firm; few fine and very fine roots; distinct nearly continuous clay films on faces of peds; few thin silt coatings on faces of some peds; common krotovinas of grayish brown (10YR 5/2) silt; common fine soft black and brown masses of iron and manganese oxide; very strongly acid; gradual wavy boundary.

3Bt3—46 to 58 inches; mottled light brownish gray (10YR 6/2) and light yellowish brown (10YR 6/4) silt loam; weak coarse prismatic structure parting to moderate medium subangular blocky; firm; few fine and very fine roots; distinct nearly continuous clay films on faces of peds; few thin silt coatings on faces of some peds; common krotovinas of grayish brown (10YR 5/2) silt; common fine soft black and brown masses of iron and manganese oxide; strongly acid; gradual wavy boundary.

3Bt4—58 to 65 inches; mottled light brownish gray (10YR 6/2), light yellowish brown (10YR 6/4), and olive yellow (2.5Y 6/6) silt loam; moderate coarse prismatic structure; firm; few fine and very fine roots; distinct nearly continuous clay films on faces of peds; few thin silt coatings on faces of some peds; few fine patches of white, noneffervescent salts; common black stains on faces of some peds and in root channels; common fine soft black and brown masses of iron and manganese oxide; strongly acid; clear smooth boundary.

3Bt5—65 to 80 inches; light brownish gray (10YR 6/2) silty clay loam; many fine and medium distinct dark

yellowish brown (10YR 4/4) and common fine distinct yellowish brown (10YR 5/6) mottles; strong coarse prismatic structure; firm; few fine and very fine roots; distinct discontinuous grayish brown (2.5Y 5/2) clay films on faces of peds; common pressure faces; few thin silt coatings on faces of some peds; few fine patches of white, noneffervescent salts; many black stains on faces of peds; common fine soft black masses of iron and manganese oxide; slightly acid.

The solum is more than 60 inches thick. Depth to the clayey 2Bt horizon ranges from 20 to 35 inches. The effective cation-exchange capacity is 50 percent or more saturated with exchangeable aluminum to a depth of 30 inches or more.

The A horizon has value of 3 to 5 and chroma of 2 to 4. It is 3 to 6 inches thick. It ranges from very strongly acid to medium acid.

Some pedons have an E horizon. This horizon has value of 5 or 6 and chroma of 3 or 4. It ranges from very strongly acid to medium acid.

The Bt and BE horizons and the Bt part of the B/E horizon have value of 5 and chroma of 4 or 5. They have few to many mottles in shades of gray or brown. They are silt loam or silty clay loam. They range from very strongly acid to medium acid. Some pedons do not have a Bt horizon.

The 2Bt horizon has value of 4 to 6 and chroma of 2, 4, or 6. It is clay or silty clay in the upper part and silty clay loam in the lower part. This horizon ranges from very strongly acid to medium acid.

The 3Bt horizon has the same range in color as the 2Bt horizon. It is silty clay loam, silt loam, or loam. It ranges from strongly acid to neutral.

Zenoria Series

The Zenoria series consists of poorly drained, slowly permeable soils that formed in loamy and clayey alluvium of late Pleistocene or early Holocene age. These soils are on low stream terraces at the elevation of flood plains. They are subject to flooding unless protected by levees. Slopes range from 0 to 2 percent.

The soils of the Zenoria series are fine-loamy, siliceous, thermic Aeric Ochraqualfs.

Zenoria soils are similar to Tensas soils and commonly are near Bienville, Cahaba, and Una soils. Tensas soils are on recent natural levees. They are clayey in the upper 20 to 36 inches and loamy in the lower part. Bienville and Cahaba soils are higher on the landscape than the Zenoria soils. Bienville soils are sandy throughout, and Cahaba soils have a reddish subsoil. Una soils are slightly lower on the landscape than the Zenoria soils. They have a thick, clayey subsoil.

Typical pedon of Zenoria clay loam, occasionally flooded; about 3.5 miles south of White Sulphur Springs, 2.4 miles northeast on Highway 8 from the Little River bridge, 4.3 miles east and south on improved parish road, 1.3 miles south on gravel road, 1.6 miles west on dirt road, 0.4 mile south on trail to highline, 0.1 mile east along highline, 50 feet south of highline; NE¼NW¼ sec. 33, T. 7 N., R. 2 E.

A1—0 to 2 inches; dark grayish brown (10YR 4/2) clay loam; weak thin platy structure parting to weak fine granular; firm; many fine and medium and few coarse roots; very strongly acid; clear smooth boundary.

A2—2 to 10 inches; dark gray (10YR 4/1) clay; many fine and medium distinct strong brown (7.5YR 4/6, 5/6) mottles; moderate coarse subangular blocky structure parting to strong coarse and very coarse granular; very firm; many fine, medium, and coarse roots; extremely acid; clear smooth boundary.

2B/E—10 to 19 inches; grayish brown (2.5Y 5/2) sandy clay loam (Bt); common fine and medium prominent yellowish brown (10YR 5/6) and strong brown (7.5YR 5/6) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; friable; common fine, medium, and coarse roots; faint discontinuous clay films on faces of peds; common spots of light brownish gray (2.5Y 6/2) fine sandy loam (E); thin coatings of clean sand and silt on faces of some peds; extremely acid; clear smooth boundary.

2Btgb1—19 to 33 inches; grayish brown (2.5Y 5/2) sandy clay loam; many medium and coarse prominent strong brown (7.5YR 4/6, 5/6) and few fine prominent red (2.5YR 4/8) mottles; moderate coarse prismatic structure parting to moderate coarse subangular blocky; firm; few fine, medium, and coarse roots; distinct nearly continuous dark grayish brown (10YR 4/2) clay films on faces of peds; thin coatings of clean sand and silt on faces of some peds; common fine brown and black nodules of iron and manganese oxide; very strongly acid; clear smooth boundary.

2Btgb2—33 to 52 inches; grayish brown (2.5Y 5/2) sandy clay loam; common medium and coarse distinct strong brown (7.5YR 5/6) and many fine and medium prominent red (2.5YR 4/6) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; distinct nearly continuous dark grayish brown (10YR 4/2) clay films on faces of peds; thin coatings of clean sand and silt on faces of some peds; few fine

brown and black nodules of iron and manganese oxide; extremely acid; clear smooth boundary.

2BCg—52 to 67 inches; light brownish gray (2.5Y 6/2) loam; many fine and medium prominent strong brown (7.5YR 5/6, 5/8), few fine prominent red (2.5YR 4/8), and common fine distinct light olive brown (2.5Y 5/4) mottles; weak coarse subangular blocky structure; friable; few fine roots; faint discontinuous clay films on faces of peds; common fine and medium strong brown (7.5YR 5/6) brittle bodies; extremely acid; clear smooth boundary.

3Cg1—67 to 75 inches; coarsely mottled light brownish gray (2.5Y 6/2) and light olive brown (2.5Y 5/4, 5/6) loamy fine sand; few fine prominent strong brown (7.5YR 5/6) mottles; massive; very friable; extremely acid; gradual smooth boundary.

3Cg2—75 to 80 inches; light brownish gray (2.5Y 6/2) fine sand; common coarse faint light yellowish brown (2.5Y 6/4) and common medium distinct light olive brown (2.5Y 5/6) mottles; massive; very friable; extremely acid.

The thickness of solum ranges from 40 to 70 inches. Reaction ranges from extremely acid to strongly acid throughout the profile. Depth to the buried horizon ranges from 6 to 20 inches. The effective cation-exchange capacity is 50 percent or more saturated with exchangeable aluminum to a depth of 30 inches or more.

The A1 horizon has value of 3 or 4. It is 2 to 5 inches thick. The A2 horizon has value of 4 or 5 and chroma of 1 or 2. It is clay, silty clay, or silty clay loam.

The 2B/E horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 or 2. It is fine sandy loam, sandy clay loam, clay loam, or loam.

The 2Btgb horizon has hue of 10YR or 2.5Y and value of 4 to 6. It generally has chroma of 1 or 2, but in some subhorizons it has chroma of 3. This horizon is mottled in shades of red, brown, or yellow. It is sandy clay loam, clay loam, or loam.

The 2BCg horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2 to 4. It is loam, fine sandy loam, very fine sandy loam, or loamy fine sand.

The 3Cg horizon is mottled in shades of gray, brown, or yellow, or it has a matrix ranging from gray to brown and has few to many mottles. This horizon is fine sand, loamy fine sand, or fine sandy loam.

Formation of the Soils

By Wayne H. Hudnall, Department of Agronomy, Agricultural Experiment Stat on, Louisiana State University Agricultural Center.

In this section, soil genesis is described and the processes and factors of soil formation are related to the soils in La Salle Parish.

Soil Genesis

Soil genesis is the phase of soil science that deals with the processes and factors of soil formation *(5)*. Generally, it is the study of the formation of soils on the landscape and of changes in soil bodies *(13)*. It is the science of the evolution of soils, which are conceived of as natural units *(33)*.

The smallest volume that can be recognized as an individual soil is called a pedon *(40)*. A pedon has three dimensions. Its lower limit is somewhat vague and arbitrary. Its lateral dimensions are large enough to permit the study of horizons to determine whether they are distinct and continuous, vary in thickness, or are discontinuous. Each pedon includes a range of horizon variability that occurs within these small areas. Generally, an individual soil cannot be adequately described and defined from one pedon. Study of several pedons is needed to determine which processes and factors were involved in the formation of a soil.

A polypedon is defined as "continuous pedons, all falling within the defined range of a single soil series. It is a real, physical soil body, limited by 'not soil' or by pedons of unlike character in respect to criteria used to define series. It has no maximum area" *(23)*.

Soil genesis is the study of an open, dynamic system of the processes and factors of soil formation. The processes are dependent variables, and the factors are independent variables. The processes and the factors are not competitive as far as their effect on soil formation is concerned. As the factors change, the process may increase or decrease in intensity or be replaced by another process. Soils are constantly being influenced by internal and external forces. In general, the internal forces are synonymous with soil-forming processes and the external forces with soil-forming factors.

Processes of Soil Formation

The complex soil-forming processes can be described as the gains, losses, translocations, and transformations that influence the kind and degree of soil horizon development *(34)*. More specifically, important soil-forming processes include those that result in additions of organic, mineral, and gaseous materials to the soil; losses of these materials from the soil; translocations of materials from one point to another within the soil; and physical and chemical transformations of mineral and organic materials within the soil.

The addition of organic matter to soils is a very important process of soil formation. It occurs to some extent in all soils. Accumulations of organic matter are greater in some soils than in others. Organic matter imparts several beneficial characteristics to the soil. It darkens the soil, increases available water and cation-exchange capacities, contributes to granulation, and serves as a source of plant nutrients in the soil. Organic matter accumulation is greatest in and above the surface layer of the soil. As a result, the surface layer is higher in organic matter content and darker than the lower horizons. Hollywood and Una are examples of soils in which the surface layer has been darkened by the addition of organic matter.

The addition of mineral material at the surface has been important in the formation of some soils in La Salle Parish. The added material, generally alluvium, provides new parent material in which the processes of soil formation can occur. The new material commonly has accumulated at a faster rate than that needed for the processes of soil formation to appreciably alter the material. As a result, depositional strata are in the lower horizons of many of the soils that formed in alluvial sediments. Although several of the soils in the parish formed in alluvial material, the depositional strata are evident only in Jena, Ouachita, and other soils that formed in recent or relatively young alluvial sediments. Materials added to soils in the form of liquids or gases are generally compounds of nitrates and sulfates that are dissolved or trapped in rainwater.

Losses of components from the soils are less noticeable than most additions to the soils, but they are important in the formation of soils. For example, when organic matter is decomposed, carbon dioxide, a by-product, is emitted into the atmosphere. Water also is lost from the soil in the form of a gas. It escapes from the soil through evaporation and through transpiration from plants. Erosion removes both mineral and organic materials from some soils. These losses are natural to some extent, or they may be accelerated by human activities. Most of the erosion in La Salle Parish is caused by moving water.

Losses also occur during the process of leaching. Many compounds and elements in soils are soluble in water. As water moves through the soils, these elements are carried in the water. In many soils they have been moved completely out of the profile. Sandy soils, such as Bienville soils, are sufficiently permeable to allow the leaching of most soluble bases in a relatively short time. In the less permeable, more clayey soils, water from rainfall moves slowly through the profile and leaching is less pronounced. For example, in the very slowly permeable Hollywood soils, most of the free carbonates that were initially in the parent material remain in the profile, but they have been leached from the upper part to the lower part. Even in these less permeable soils, the soluble elements may be moved completely out of the profile if the amount of rainfall is sufficient. The effects of leaching are least pronounced in soils that formed in relatively young parent material that was initially high in content of bases. Examples are Fausse and Sharkey soils.

The translocation of materials in the soil profile has been an important process during the formation of most of the soils in the parish. The movement of solids out of part of the profile is termed eluviation. The movement of solids into a lower part of the profile is called illuviation. In soils having pores that are large enough and soil material that is small enough, water can move the material in suspension downward as it moves through the soils. Because of their small size, clay particles are moved downward in this manner. The translocation and accumulation of clay is evident in Bursley, Cahaba, Falkner, Keithville, Lexington, Ruston, Smithdale, and Tippah soils.

Products other than clay also are translocated. Iron and manganese have been moved from the upper to the lower part of many of the soils in the parish. This translocation results from alternating oxidizing and reducing conditions, which are associated primarily with fluctuating water-saturated zones in the soils. Reducing occurs when the soil is saturated with water for relatively long periods and has a low amount of oxygen. Reduced compounds of iron and manganese result in gray colors, which are characteristic of the Bg and Cg horizons in Forestdale, Guyton, and other soils. If the reduced conditions prevail for a sufficient time and if the level of the water table is fluctuating, the iron and manganese may be translocated to a lower part of the profile and precipitated at the top of the saturated zone. This process can result in grayish horizons that have brownish or reddish mottles. These horizons are common in Bursley, Foley, Malbis, Oula, Zenoria, and other soils.

The transformation of mineral and organic substances in soils also is a major process of soil formation. Some transformations are referred to as geochemical weathering. Processes that take place as part of geochemical weathering are oxidation, reduction, combinations of these in alternating cycles, hydration, solution, and hydrolysis.

Oxidation is a geochemical reaction that occurs in well aerated soils and parent materials. The most easily recognized oxidation reaction is the oxidation of a ferrous ion to a ferric ion. This process is most common in soils that are rich in ferrous ion. This iron is in the mineral species of iron-bearing hornblendes and pyroxenes of the primary mineral group and in soils in which glauconite or siderite makes up part of the parent material. Oxidation is an important soil-forming process in Falkner soils.

Hydration refers to a process in which water molecules or hydroxyl groups are united with minerals without being a part of the minerals. It occurs primarily on the surfaces or the edges of mineral grains. In many cases, however, as in simple salts, it may be part of the structure. An excellent example of this chemical reaction is the hydration of anhydrite to form the mineral gypsum. Gypsum is a commonly occurring mineral in some of the clayey soils in the parish in which there is a source of sulfate, presumably from a marine environment, and a source of calcium, either from the sediments themselves or from mineral weathering, as when plagioclase releases calcium into the system. Gypsum is common in Falkner and Tippah soils.

Hydrolysis refers to the chemical reaction of the hydrogen ion with individual elements within crystal structures. The highly reactive hydrogen ion replaces one of the basic ions in the structure of the mineral. In general, hydrolysis is the most important chemical weathering process and results in a complete disintegration of primary minerals in all soils. This process also plays a major role in the exchange that makes plant nutrients available to plants.

Solution is the simple process of dissolving salts, such as carbonates and sulfates. As water moves through the soil, the dissolved salts may be removed from the soil system or deposited at a lower depth in

the profile. The accumulation of carbonates and sulfates (gypsum) in a soil horizon is indicated by the letters k (carbonates) and y (gypsum) in soil horizon designators. Examples are the Bk1 and Bk2 horizons in Hollywood soils.

A soil-forming process that is not fully understood is the formation of a fragipan, or a dense, brittle layer in the subsoil. Libuse, Pheba, Providence, Savannah, and Shatta soils have a fragipan. The fragic material has many vesicular pores, but water does not readily move through the material. Several hypotheses have been offered to explain the formation of fragipans. Either chemical or physical reactions or a combination of both reactions have resulted in their formation.

Factors of Soil Formation

The character and development of soils are controlled by external factors *(6, 17)*. A study of these factors can be a great help in understanding the genesis of soils. A factor of soil formation has been defined as an agent, force, condition, relationship, or a combination of these that influences or has influenced the parent material of the soil with the potential of changing it *(13)*. From this definition, a model can be developed to define and study the soil-forming factors. One frequently employed model indicates that the soils are a function of five factors that define the state and history of soil systems and are therefore referred to as state factors *(21)*. These soil-forming factors are climate, living organisms, relief, parent material, and time.

The factors define the soil system in terms of variables that control the characteristics of the system and not in terms of processes, causes, or forces that are active in the system. The factors are assumed to vary independently. Since they are independent, it is possible to describe each one of these factors and its expression in the soils separately.

Climate

Certain local conditions, or microclimates, show the influence of climate on soil formation in relatively small areas. The magnitude of the influence of climate on soil formation, however, can be best evaluated by making comparisons that are global in scope. Climates shift with time. Climatic changes occur over long periods. Some of them occur within the age of many soils. The two features of climate that have been most closely correlated to soil properties are rainfall and temperature *(13)*. Although average climatic conditions are often used, the extremes of climate occurring within a given region may be more influential in the development of certain soil properties. Both rainfall and temperature can vary, depending on the relief or elevation within a general area.

In general, rainfall is uniform throughout the parish. As a result, major differences within the soils are not the result of differences in rainfall. The loamy soils, such as Ruston and Smithdale soils, are among the most highly leached soils in the parish. Their properties, however, result not only from the movement of water but also from the age of the soils and the parent material. When temperature increases in the summer, the solubility of elements in minerals increases. If temperatures are below freezing in winter, the physical action of water, primarily ice, plays an important role in the physical alteration of the soils. The effect of this action is minimal in La Salle Parish because the climate is not extremely cold.

To some degree, the intensity and annual distribution of rainfall are more important than the total amount of annual rainfall. The rainfall is not evenly distributed throughout the year, and severe storms sometimes occur. Both of these factors affect the type and rate of reactions in which water is involved.

Except for the role of the water in erosion and deposition of soil material, the important functions of water are within the soil profile. Morphological characteristics may be a result of excessive or inadequate water. Properties within the soil that have resulted from excessive water, in combination with other factors, are exhibited in soils that are highly leached and acid. These soils may have gray colors because of reduction.

During excessively dry periods, cracks can form in very clayey soils that have clay mineralogy. The clay shrinks during dry periods and swells during wet periods. Bayoudan and Hollywood soils and, to a certain extent, Alligator and Sharkey soils crack as they dry. The cracks may be a few inches to several inches across and a few inches to several inches deep, depending on the soil and how dry the soil becomes. Soil material falls into the cracks. Then, as the soil becomes wet, the clays expand, eliminating the cracks. This process effectively churns the soil.

The effects of the uneven distribution of rainfall also are evident in eluviated and illuviated soils. Forestdale, Keithville, Kurth, Lexington, Malbis, and Vick soils are examples.

Temperature has been considered an independent soil-forming factor by many scientists. It influences the reactions involved in the processes of soil formation. It is the driving force in most models of evapotranspiration. Combined with the uneven distribution of rainfall, evapotranspiration may be the most important climatic condition affecting the soil-forming processes. The importance of temperature is

expressed in Van't Hoff's temperature rule. According to this rule, every 10 degrees rise in temperature increases the speed of a chemical reaction by a factor of two or three *(42)*.

Generally, the amount of solar radiation increases with elevation. The rate of this increase is most rapid in the lower, dust-filled layers of the air. The sorption of solar radiation at the surface is affected by many variables, such as soil color, aspect (southern slopes are always warmer than northern slopes), and the vegetative cover. Although the amount of solar radiation may increase with elevation, temperature generally decreases with elevation. The change in elevation within La Salle Parish is not sufficient to cause a significant change in the mean annual soil temperature.

Detailed information about the climate in La Salle Parish is given in the section "General Nature of the Parish."

Living Organisms

This major external soil-forming factor significantly affects the formation of major horizons and the carbon and nitrogen in soils. Living organisms cycle carbon through the atmosphere, oceans, and soils. Nitrogen is interrelated with the carbon cycle. The biosphere serves as a major sink for the carbon cycle. Carbon is taken up by plants through the process of photosynthesis, which produces organic material with the aid of sunlight. Through the process of decomposition by microorganisms, the carbon is returned to the atmosphere.

Nitrogen is a major plant nutrient. It is used in the production of organic material through photosynthesis. Whenever organic matter is decomposed, the nitrogen is released for plant use and the carbon is returned directly to the atmosphere in the form of carbon dioxide. The somewhat resistant organic material is retained in the soil. This material generally is referred to as humus. Because of its chemical composition and the size of its particles, humus increases the rate of water infiltration, the available water capacity, and the cation-exchange capacity. Because of the increased cation-exchange capacity, nutrients, such as calcium, magnesium, and potassium, can be stored in the soil. These factors combine to improve tilth in the soil.

The natural vegetation in La Salle Parish is diverse. Soils on low flats and in drainageways are vegetated primarily by hardwoods. The gently sloping soils in the parish support mixed hardwoods and pine, whereas the soils on the upper slopes and ridges are vegetated primarily by pine and a few hardwoods. If the parent material is the same, soils that formed under hardwoods generally have slightly higher reaction than soils that formed under pines.

Soils that formed under hardwoods, pines, and mixed pines and hardwoods generally have a thicker eluvial (E) horizon than soils that formed under prairie vegetation. The A horizon in soils that formed under grasses generally is thicker and contains more organic matter than that in soils that formed under pine and mixed hardwoods and pines. Differences in the amount of organic matter that has accumulated in the soils are influenced by other factors, such as temperature and rainfall.

Under conditions that are optimal for microbial activity, organic matter production and decomposition are in equilibrium. Accumulation will not occur unless there is a change in the factor controlling the equilibrium. Additions of organic matter occur when annual production is high and conditions are not optimal for decomposition. Most of the soils in the parish are in an ecosystem in which decomposition of organic matter exceeds the ability of the vegetation to return organic matter to the soil.

Parent Material

Parent material has been defined as "the state of the soil system at time zero of soil formation" *(22)*. Thus, parent material is the initial physical body that is changed by other soil-forming factors over time. In general, the younger the soil, the greater the influence of the parent material on soil properties. For example, the young Dundee soils exhibit more properties associated with the initial deposits than the much older Ruston soils, which have very few properties that can be associated with the initial parent material. One should not conclude, however, that the influence of the parent material is not evident in weathered soils or that the parent material is no longer an independent factor. The nature of the parent material can be expressed in many ways in the soil profile. These include soil color, texture, and mineralogy. These properties may be related to physical and chemical properties, such as heat absorption, susceptibility to erosion, the shrink-swell potential, and the cation-exchange capacity.

Relief

Relief in La Salle Parish varies. It ranges from very low on the flood plains and natural terraces in the Mississippi River Valley to high in the steep and strongly dissected hills. Relief generally can be related to the physiographic regions and geologic units in the parish.

Relief influences soil formation through its effects on soil drainage, runoff, and erosion. Within specific geographic regions, several soil properties are related to relief. These are the thickness of the solum, the thickness of the A horizon and its content of organic

matter, the relative wetness of the profile, the color of the profile, the degree of horizon differentiation, soil reaction (pH), and the content of soluble salts. The thickness of the solum is one of the most obvious of the properties related to relief. The solum in the more nearly level soils tends to be thicker than that in the steeper soils on side slopes. It is thicker, for example, in Ruston soils, which are on gentle slopes, than in Smithdale soils, which are on more strongly sloping side slopes.

Relief also affects the moisture relationships in the soil. It affects the depth to ground water and the amount of water that is available for photosynthesis. In general, the water table has relief that is similar to but of lesser amplitude than the relief of the land surface. It is closer to the surface in depressions than on the high parts of the landscape. If the parent material is the same, a seasonal water table is more common in soils that are in areas of low relief than in soils that are on convex landscapes. If the parent material is clayey and relief is low, the ridgetops may be the wettest areas on the landscape.

Time

When considering the length of time needed for soil formation, pedologists normally do not think in terms of inches or centimeters but in terms of horizons, sola, and profile development. They do not think in terms of absolute time but in terms of the rate of change in the soil properties. Time or rate of change can be related to the relative stage of development, the absolute dating of horizons and profiles, the rate of formation, and the relation to the age and slope of the landform and associated weathering complex *(18, 20)*.

Several hypotheses or models have been developed. Jenny and Birkeland proposed the continuous steady state system *(6, 22)*. Under this system, time is uninterrupted and soil formation begins at time zero. As the properties of the soil are expressed through the processes of soil formation, the continuous steady state model dictates that once a process or the development of a feature has begun, it continues with time until there is a major change in one of the other soil-forming factors. Assuming no major change in a soil-forming factor, as time progresses, the morphological feature is expressed in its maximal state without giving way to other morphological features. For example, if at time zero Fausse soils have no subhorizons as the processes of soil formation begin, a cambic horizon is initiated in the profile. Under the steady state concept, this horizon would continue to develop through time until a maximal cambic horizon is developed, assuming that there is no additional change in the other soil-forming processes. The only thing that changes is time.

Another example is the formation of an argillic horizon below an E horizon in Ruston and other soils. Through time, these horizons reach their maximal development. The rate of change at the beginning might be great, but through time, unless other processes change, additional horizons or morphological features are not expressed.

Because soils represent a dynamic system, it would appear that the continuous steady state hypothesis involving the relationship of time and pedogenic development is in error. Bushnell, Cline, and Arnold propose the sequential model of soil formation *(4, 14, 15)*. In this model, the various processes operate concurrently at all stages of soil formation. Some processes proceed so slowly that they have little effect, whereas others are so rapid that they are dominantly expressed as morphologic features in the soil. As long as the relative rates of the processes continue unchanged, the resulting soil development is characterized by an increased degree of expression of a given set of properties.

The sequential model is sometimes referred to as polygenesis. It has two major features. First, a soil morphological entity may be a consequence of a combination of several genetic factors. Second, the morphological expression of soil processes may be a result of several pathways. Suppose a soil begins to form in loamy parent material in an upland area with a gentle slope, a plant succession to pine forest, and a climate similar to that of the present. The soil might progress to the formation of a darkened surface layer through the accumulation of organic carbon. An argillic horizon might form sequentially with the formation of an E horizon. The resultant soil would be similar to Ruston soils. It would have formed sequentially, assuming no substantial changes in the parent material, climate, living organisms, or relief with time.

Suppose that the factors in this model changed. For instance, climate may have become wetter or drier. When a major factor changes, time as a factor of formation returns to zero.

Morphological properties are commonly considered in ascertaining the age of soils. For example, Bienville soils, which have a thick E horizon are considered older than the Sacul soils, which have a relatively thin E horizon. Bienville soils are actually younger, however, because other factors, such as parent material, climate, and living organisms, play an important role in determining the thickness of horizons.

Geology can be used as an indicator of the relative age of the soil. One must remember, however, that pedogenic time is returned to zero each time there is a major or catastrophic event that affects the landscape. Catastrophic events generally are used to define the

beginning of a major geologic period.

The rate of weathering decreases with time *(16)*. It becomes constant when an equilibrium thickness of the weathering residue is reached. Soil formation is seldom a uniform, unidirectional process through time. Minor fluctuations in the environment are built-in characteristics that result in constant readjustment.

Climatic changes were particularly intense during the Quaternary as a result of the advances and retreats of the polar mountain glaciers. These climatic changes and the depositions in the Quaternary are readily evidenced in Louisiana. Other major geologic events that have occurred are the uplifting and subsequent erosion of the Tertiary-age sediments in the west-central part of La Salle Parish.

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Glossary

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Bottom land. The normal flood plain of a stream, subject to flooding.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a channer.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that

of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Dense layer. A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Excess sodium (in tables). Excess exchangeable sodium in the soil. The resulting poor physical properties restrict the growth of plants.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grains are grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured soil. Sandy clay, silty clay, and clay.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. The major horizons are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, any plowed or disturbed surface layer.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) granular, prismatic, or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying horizon The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon—Soft, consolidated bedrock beneath the soil.

R layer.—Hard, consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake in inches per hour is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent.* The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil, adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the

liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plinthite. The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are—

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Rill. A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rippable. Bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 draw bar horsepower rating.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the substratum. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils,

slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slippage (in tables). Soil mass susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the substratum. The living roots and plant and animal activities are largely confined to the solum.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Breaking up a compact subsoil by pulling a special chisel through the soil.

Substratum. The part of the soil below the solum.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from about 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1952-81 at the Belah fire tower)

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days*	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January-----	56.7	35.8	46.3	80	13	79	4.81	2.41	6.89	7	0.5
February----	61.5	38.5	50.0	81	18	127	4.96	2.82	6.84	7	.5
March-------	69.3	45.8	57.6	86	24	270	5.84	2.94	8.36	8	.2
April-------	78.3	55.4	66.9	89	35	507	5.43	1.99	8.29	6	.0
May---------	84.2	61.8	73.0	94	45	713	5.96	3.05	8.49	7	.0
June--------	90.9	68.0	79.5	99	54	885	3.58	1.37	5.42	6	.0
July--------	93.6	70.9	82.3	102	62	1,001	5.07	2.73	7.12	8	.0
August------	93.4	69.6	81.5	102	59	977	4.02	1.78	5.92	6	.0
September---	89.0	65.5	77.3	98	48	819	4.07	1.48	6.22	6	.0
October-----	80.1	53.6	66.9	95	34	524	3.65	1.07	5.77	4	.0
November----	68.8	44.8	56.8	86	23	229	4.45	1.97	6.56	6	.0
December----	60.5	38.2	49.4	79	16	96	5.91	3.22	8.27	8	.0
Yearly:											
Average---	77.2	54.0	65.6	---	---	---	---	---	---	---	---
Extreme---	---	---	---	103	13	---	---	---	---	---	---
Total-----	---	---	---	---	---	6,227	57.75	47.16	67.80	79	1.2

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1952-81 at the Belah fire tower)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Mar. 13	Mar. 22	Mar. 29
2 years in 10 later than--	Mar. 2	Mar. 14	Mar. 23
5 years in 10 later than--	Feb. 10	Feb. 28	Mar. 13
First freezing temperature in fall:			
1 year in 10 earlier than--	Nov. 15	Nov. 4	Oct. 26
2 years in 10 earlier than--	Nov. 24	Nov. 11	Oct. 31
5 years in 10 earlier than--	Dec. 11	Nov. 25	Nov. 9

TABLE 3.--GROWING SEASON

(Recorded in the period 1952-81 at the Belah fire tower)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	271	239	217
8 years in 10	282	249	225
5 years in 10	303	269	241
2 years in 10	324	289	256
1 year in 10	335	300	264

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
Ag	Alligator clay, occasionally flooded	2,380	0.6
At	Alligator clay, frequently flooded	4,670	1.1
Bb	Bayoudan silt loam, 1 to 5 percent slopes	3,700	0.9
Bc	Bayoudan silty clay loam, 5 to 15 percent slopes	8,660	2.0
Bd	Bayoudan clay, 15 to 40 percent slopes	280	0.1
Be	Bienville loamy fine sand, 1 to 3 percent slopes	900	0.2
Br	Bursley silt loam	2,740	0.6
Bs	Bursley silt loam, occasionally flooded	11,930	2.8
Ch	Cahaba fine sandy loam, 1 to 3 percent slopes	2,690	0.6
Da	Deerford silt loam	4,660	1.1
Db	Deerford silt loam, occasionally flooded	3,850	0.9
Dd	Dundee loam	2,540	0.6
Fa	Falkner silt loam	32,810	7.8
Fc	Fausse clay, frequently flooded	7,450	1.8
Fe	Foley silt loam, occasionally flooded	9,790	2.3
Ff	Forestdale silty clay loam	5,850	1.4
Fh	Forestdale silty clay loam, occasionally flooded	10,990	2.6
Fr	Frizzell silt loam	11,100	2.6
Go	Gore silt loam, 5 to 15 percent slopes	6,620	1.6
Gu	Guyton silt loam	4,430	1.0
GY	Guyton and Ouachita soils, frequently flooded	27,840	6.6
Hw	Hollywood clay, 1 to 5 percent slopes	1,300	0.3
Ke	Keithville very fine sandy loam, 1 to 5 percent slopes	5,990	1.4
Ks	Kisatchie-Oula complex, 8 to 40 percent slopes	12,450	2.9
Ku	Kurth fine sandy loam, 1 to 5 percent slopes	1,640	0.4
Le	Lexington silt loam, 1 to 3 percent slopes	980	0.2
Lf	Libuse silt loam, 1 to 5 percent slopes	9,900	2.3
Mb	Malbis fine sandy loam, 1 to 5 percent slopes	4,440	1.0
OE	Ouachita and Jena soils, frequently flooded	19,920	4.7
Ou	Oula fine sandy loam, 5 to 20 percent slopes	2,500	0.6
Pb	Pheba loam	11,630	2.7
Pg	Pits, gravel	600	0.1
Pr	Providence silt loam, 1 to 3 percent slopes	18,920	4.5
Pv	Providence silt loam, 3 to 8 percent slopes	2,340	0.6
Rs	Ruston fine sandy loam, 1 to 3 percent slopes	20,840	5.0
Rt	Ruston fine sandy loam, 3 to 8 percent slopes	28,084	6.6
Sa	Sacul fine sandy loam, 1 to 5 percent slopes	556	0.1
Sb	Sacul fine sandy loam, 5 to 20 percent slopes	3,890	0.9
Sf	Savannah fine sandy loam, 1 to 5 percent slopes	8,850	2.1
Sh	Sharkey clay, frequently flooded	4,580	1.1
Sk	Shatta very fine sandy loam, 1 to 5 percent slopes	3,060	0.7
Sm	Smithdale fine sandy loam, 12 to 30 percent slopes	33,100	7.9
Te	Tensas silty clay, occasionally flooded	1,200	0.3
Tp	Tippah silt loam, 1 to 5 percent slopes	30,600	7.3
Un	Una silty clay loam, frequently flooded	9,520	2.2
Vk	Vick silt loam	2,380	0.6
Ze	Zenoria clay loam, occasionally flooded	2,470	0.6
	Water	15,870	3.7
	Total	423,490	100.0

TABLE 5.--PRIME FARMLAND

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name)

Map symbol	Soil name
Br	Bursley silt loam
Ch	Cahaba fine sandy loam, 1 to 3 percent slopes
Dd	Dundee loam
Fa	Falkner silt loam, 0 to 2 percent slopes
Ff	Forestdale silty clay loam (where adequately drained)
Fr	Frizzell silt loam
Gu	Guyton silt loam (where adequately drained)
Hw	Hollywood clay, 1 to 5 percent slopes
Ke	Keithville very fine sandy loam, 1 to 5 percent slopes
Ku	Kurth fine sandy loam, 1 to 5 percent slopes
Le	Lexington silt loam, 1 to 3 percent slopes
Lf	Libuse silt loam, 1 to 5 percent slopes
Mb	Malbis fine sandy loam, 1 to 5 percent slopes
Pb	Pheba loam
Pr	Providence silt loam, 1 to 3 percent slopes
Rs	Ruston fine sandy loam, 1 to 3 percent slopes
Rt	Ruston fine sandy loam, 3 to 8 percent slopes
Sa	Sacul fine sandy loam, 1 to 5 percent slopes
Sf	Savannah fine sandy loam, 1 to 5 percent slopes
Sk	Shatta very fine sandy loam, 1 to 5 percent slopes
Tp	Tippah silt loam, 1 to 5 percent slopes
Vk	Vick silt loam

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Map symbol and soil name	Land capability	Cotton lint	Corn	Soybeans	Common bermudagrass	Improved bermudagrass	Bahiagrass
		Lbs	Bu	Bu	AUM*	AUM*	AUM*
Ag------------- Alligator	IVw	---	---	25	6.0	---	---
At------------- Alligator	Vw	---	---	---	5.0	---	---
Bb------------- Bayoudan	IVe	---	---	---	4.5	10.0	6.5
Bc------------- Bayoudan	VIe	---	---	---	3.5	9.5	6.0
Bd------------- Bayoudan	VIIe	---	---	---	3.5	5.0	---
Be------------- Bienville	IIs	---	65	25	5.5	11.0	7.5
Br------------- Bursley	IIIw	500	65	25	5.5	11.0	7.5
Bs------------- Bursley	IVw	---	---	20	4.5	---	6.0
Ch------------- Cahaba	IIe	750	90	30	7.0	14.0	10.0
Da------------- Deerford	IIIw	400	---	30	6.0	---	6.5
Db------------- Deerford	IVw	---	---	20	5.5	---	---
Dd------------- Dundee	IIw	650	90	35	6.5	15.0	9.0
Fa------------- Falkner	IIw	525	75	30	4.5	10.0	6.5
Fc------------- Fausse	VIIw	---	---	---	---	---	---
Fe------------- Foley	IVw	---	---	25	6.0	---	6.5
Ff------------- Forestdale	IIIw	500	50	30	6.5	13.0	---
Fh------------- Forestdale	IVw	---	---	25	5.5	---	---
Fr------------- Frizzell	IIw	450	60	25	5.0	11.0	7.0
Go------------- Gore	VIe	---	---	---	4.5	10.0	6.5

See footnote at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Land capability	Cotton lint	Corn	Soybeans	Common bermudagrass	Improved bermudagrass	Bahiagrass
		Lbs	Bu	Bu	AUM*	AUM*	AUM*
Gu------------- Guyton	IIIw	---	55	20	6.5	---	9.5
GY------------- Guyton-Ouachita	Vw	---	---	---	5.5	---	---
Hw------------- Hollywood	IVe	---	60	30	---	---	5.0
Ke------------- Keithville	IIIe	475	---	25	4.5	10.0	6.5
Ks------------- Kisatchie-Oula	VIe	---	---	---	4.0	---	6.0
Ku------------- Kurth	IIIe	---	50	---	5.0	12.0	7.5
Le------------- Lexington	IIe	700	90	30	6.5	13.0	9.5
Lf------------- Libuse	IIIe	550	65	25	6.5	13.0	9.5
Mb------------- Malbis	IIe	650	80	30	6.5	12.5	9.0
OE------------- Ouachita-Jena	IVw	---	---	---	6.9	---	9.0
Ou------------- Oula	VIe	---	---	---	5.0	6.0	5.5
Pb------------- Pheba	IIw	475	65	25	6.0	11.0	7.0
Pg. Pits							
Pr------------- Providence	IIe	650	90	30	6.5	11.0	7.5
Pv------------- Providence	IIIe	575	80	25	6.0	10.0	7.0
Rs------------- Ruston	IIe	650	80	30	6.0	12.0	9.5
Rt------------- Ruston	IIIe	600	75	25	5.5	12.0	9.5
Sa------------- Sacul	IIIe	---	55	25	6.5	11.0	9.0
Sb------------- Sacul	VIe	---	---	---	5.5	---	7.5
Sf------------- Savannah	IIe	550	75	30	6.0	12.0	9.0

See footnote at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Land capability	Cotton lint	Corn	Soybeans	Common bermudagrass	Improved bermudagrass	Bahiagrass
		Lbs	Bu	Bu	AUM*	AUM*	AUM*
Sh--------------- Sharkey	Vw	---	---	---	4.0	---	---
Sk--------------- Shatta	IIIe	475	65	25	6.0	12.0	9.0
Sm--------------- Smithdale	VIe	---	---	---	5.0	---	7.5
Te--------------- Tensas	IVw	---	---	25	6.0	---	---
Tp--------------- Tippah	IIe	650	80	30	5.5	10.0	7.0
Un--------------- Una	Vw	---	---	---	6.0	---	---
Vk--------------- Vick	IIw	450	70	25	5.0	11.5	7.5
Ze--------------- Zenoria	IVw	---	---	25	4.5	---	---

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
Ag: Alligator	8W	Slight	Severe	Moderate	Moderate	Eastern cottonwood	95	8	Eastern cottonwood, green ash, American sycamore.
						Green ash	80	4	
						Water oak	90	6	
						Nuttall oak	---	---	
						Sugarberry	---	---	
						Honeylocust	---	---	
At: Alligator	7W	Slight	Severe	Severe	Moderate	Eastern cottonwood	90	7	Eastern cottonwood, baldcypress.
						Green ash	70	3	
						Baldcypress	---	---	
						Nuttall oak	---	---	
						Overcup oak	---	---	
						Water hickory	---	---	
						Water locust	---	---	
Bb, Bc, Bd: Bayoudan	8C	Moderate	Moderate	Slight	Moderate	Shortleaf pine	70	8	Loblolly pine.
						Loblolly pine	80	8	
Be: Bienville	10S	Slight	Severe	Moderate	Slight	Loblolly pine	96	10	Loblolly pine.
						Longleaf pine	88	8	
						Shortleaf pine	75	8	
Br, Bs: Bursley	6W	Slight	Moderate	Slight	Moderate	Sweetgum	85	6	Sweetgum, water oak, American sycamore.
						Water oak	80	5	
						Willow oak	80	5	
						Nuttall oak	---	---	
						Swamp chestnut oak	---	---	
						Green ash	---	---	
Ch: Cahaba	9A	Slight	Slight	Slight	Moderate	Loblolly pine	90	9	Loblolly pine, sweetgum, water oak.
						Shortleaf pine	70	8	
						Yellow poplar	---	---	
						Sweetgum	90	7	
						Southern red oak	---	---	
						Water oak	---	---	
Da, Db: Deerford	9W	Slight	Moderate	Slight	Severe	Loblolly pine	92	9	Loblolly pine, sweetgum.
						Sweetgum	86	7	
						Nuttall oak	---	---	
						Water oak	82	5	
Dd: Dundee	12W	Slight	Moderate	Slight	Moderate	Cherrybark oak	105	12	Eastern cottonwood, sweetgum, water oak.
						Sweetgum	100	10	
						Water oak	95	6	
						Nuttall oak	---	---	
						Willow oak	---	---	
						American sycamore	---	---	
Fa: Falkner	8W	Slight	Moderate	Slight	Moderate	Loblolly pine	85	8	Loblolly pine, shortleaf pine.
						Shortleaf pine	75	8	
						Sweetgum	90	7	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordi- nation symbol	Management concerns: Erosion hazard	Management concerns: Equip- ment limita- tion	Management concerns: Seedling mortal- ity	Management concerns: Plant competi- tion	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Produc- tivity class*	Trees to plant
Fc--------------- Fausse	6W	Slight	Severe	Severe	Moderate	Baldcypress---------	96	6	Baldcypress.
						Water hickory-------	---	---	
						Water tupelo--------	---	---	
						Overcup oak---------	---	---	
						Black willow--------	---	---	
						Water locust--------	---	---	
Fe--------------- Foley	6W	Slight	Severe	Moderate	Moderate	Green ash-----------	98	6	Sweetgum, American sycamore.
						Overcup oak---------	---	---	
						Nuttall oak---------	---	---	
						Baldcypress---------	---	---	
						Water hickory-------	---	---	
Ff, Fh----------- Forestdale	3W	Slight	Moderate	Moderate	Severe	Green ash-----------	78	3	Eastern cottonwood, Nuttall oak, sweetgum, American sycamore.
						Overcup oak---------	---	---	
						Nuttall oak---------	99	---	
						Water oak-----------	90	6	
						Willow oak----------	94	6	
						Water hickory-------	---	---	
						Sugarberry----------	---	---	
						Baldcypress---------	---	---	
Fr--------------- Frizzell	9W	Slight	Moderate	Slight	Moderate	Loblolly pine-------	90	9	Loblolly pine.
						Sweetgum------------	90	7	
						Water oak-----------	---	---	
Go--------------- Gore	8C	Slight	Moderate	Moderate	Moderate	Loblolly pine-------	78	8	Loblolly pine.
						Shortleaf pine------	---	---	
Gu--------------- Guyton	9W	Slight	Severe	Moderate	Severe	Loblolly pine-------	90	9	Loblolly pine, sweetgum.
						Sweetgum------------	---	---	
						Green ash-----------	---	---	
						Southern red oak----	---	---	
						Water oak-----------	---	---	
GY:									
Guyton----------	9W	Slight	Severe	Moderate	Moderate	Loblolly pine-------	90	9	Loblolly pine, sweetgum.
						Sweetgum------------	---	---	
						Green ash-----------	---	---	
						Southern red oak----	---	---	
						Water oak-----------	---	---	
Ouachita--------	11W	Slight	Moderate	Slight	Moderate	Loblolly pine-------	100	11	Loblolly pine, sweetgum.
						Sweetgum------------	100	10	
						Eastern cottonwood--	100	9	
Hw--------------- Hollywood	9W	Slight	Moderate	Moderate	Moderate	Loblolly pine-------	90	9	Loblolly pine.
						Sweetgum------------	90	7	
						Shortleaf pine------	---	---	
						Eastern redcedar----	---	---	
						Southern red oak----	---	---	
Ke--------------- Keithville	9W	Slight	Moderate	Slight	Moderate	Loblolly pine-------	90	9	Loblolly pine.
						Shortleaf pine------	80	9	
						Sweetgum------------	---	---	
						Southern red oak----	---	---	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
Ks:									
Kisatchie-------	6D	Severe	Moderate	Moderate	Moderate	Loblolly pine-------	70	6	Loblolly pine,
						Shortleaf pine------	---	---	shortleaf pine.
Oula-----------	8C	Severe	Moderate	Slight	Moderate	Loblolly pine-------	85	8	Loblolly pine.
						Shortleaf pine------	75	8	
Ku-------------- Kurth	9A	Slight	Slight	Slight	Moderate	Loblolly pine-------	90	9	Loblolly pine,
						Shortleaf pine------	80	9	sweetgum,
						Sweetgum------------	90	7	water oak.
						Water oak-----------	80	5	
						Southern red oak----	80	4	
Le-------------- Lexington	10A	Slight	Slight	Slight	Moderate	Loblolly pine-------	95	10	Loblolly pine,
						Southern red oak----	80	4	cherrybark oak,
						Cherrybark oak------	86	7	sweetgum.
						Sweetgum------------	90	7	
Lf-------------- Libuse	9A	Slight	Slight	Slight	Moderate	Loblolly pine-------	87	9	Loblolly pine.
						Longleaf pine-------	73	6	
						Shortleaf pine------	---	---	
						Sweetgum------------	85	6	
						Southern red oak----	---	---	
Mb-------------- Malbis	9A	Slight	Slight	Slight	Moderate	Loblolly pine-------	90	9	Loblolly pine.
						Shortleaf pine------	---	---	
						Longleaf pine-------	80	7	
						Sweetgum------------	---	---	
						Southern red oak----	---	---	
OE:									
Ouachita--------	9W	Slight	Moderate	Slight	Moderate	Loblolly pine-------	100	9	Loblolly pine,
						Sweetgum------------	100	10	sweetgum,
						Eastern cottonwood--	100	9	American
									sycamore,
									eastern
									cottonwood.
Jena-----------	9W	Slight	Moderate	Moderate	Moderate	Loblolly pine-------	100	9	Loblolly pine,
						Sweetgum------------	90	7	American
						Water oak-----------	80	5	sycamore,
						Southern red oak----	---	---	eastern
						White oak-----------	---	---	cottonwood.
Ou-------------- Oula	8C	Moderate	Moderate	Slight	Moderate	Loblolly pine-------	85	8	Loblolly pine.
						Shortleaf pine------	75	8	
						Southern red oak----	---	---	
Pb-------------- Pheba	9W	Slight	Moderate	Slight	Moderate	Loblolly pine-------	90	9	Loblolly pine.
						Shortleaf pine------	80	9	
						Sweetgum------------	90	7	
						Southern red oak----	---	---	
Pr-------------- Providence	9W	Slight	Moderate	Slight	Moderate	Loblolly pine-------	87	9	Loblolly pine,
						Shortleaf pine------	---	---	sweetgum.
						Sweetgum------------	90	7	
						Southern red oak---	---	---	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
Pv-------------- Providence	9W	Slight	Moderate	Slight	Moderate	Loblolly pine-------	87	9	Loblolly pine, sweetgum.
						Shortleaf pine------	---	---	
						Sweetgum-----------	90	7	
						Southern red oak----	---	---	
Rs, Rt----------- Ruston	9A	Slight	Slight	Slight	Slight	Loblolly pine-------	91	9	Loblolly pine, shortleaf pine.
						Shortleaf pine------	---	---	
						Longleaf pine-------	76	6	
						Southern red oak----	---	---	
Sa, Sb----------- Sacul	8C	Moderate	Moderate	Slight	Moderate	Loblolly pine-------	80	8	Loblolly pine, shortleaf pine.
						Shortleaf pine------	70	8	
						Southern red oak----	---	---	
						Hickory------------	---	---	
Sf-------------- Savannah	9W	Slight	Moderate	Slight	Moderate	Loblolly pine-------	88	9	Loblolly pine, sweetgum, American sycamore.
						Longleaf pine-------	78	7	
						Shortleaf pine------	---	---	
						Sweetgum-----------	85	6	
						Southern red oak----	---	---	
Sh-------------- Sharkey	6W	Slight	Severe	Severe	Moderate	Green ash-----------	100	6	Baldcypress, eastern cottonwood.
						Water hickory-------	---	---	
						Overcup oak---------	---	---	
						Baldcypress---------	---	---	
						Black willow--------	---	---	
						Water locust--------	---	---	
Sk-------------- Shatta	9A	Slight	Moderate	Slight	Moderate	Loblolly pine-------	87	9	Loblolly pine, shortleaf pine.
						Shortleaf pine------	---	---	
						Longleaf pine-------	73	6	
						Sweetgum-----------	---	---	
						Southern red oak----	---	---	
Sm-------------- Smithdale	9R	Moderate	Moderate	Slight	Slight	Loblolly pine-------	86	9	Loblolly pine, longleaf pine, shortleaf pine.
						Longleaf pine-------	69	5	
						Shortleaf pine------	---	---	
Te-------------- Tensas	3W	Slight	Severe	Moderate	Moderate	Willow oak----------	60	3	Eastern cottonwood, baldcypress.
						Water hickory-------	---	---	
						Water oak-----------	---	---	
						Sugarberry----------	---	---	
						Nuttall oak---------	---	---	
Tp-------------- Tippah	8A	Slight	Slight	Slight	Moderate	Loblolly pine-------	78	8	Cherrybark oak, loblolly pine, sweetgum.
						Cherrybark oak------	95	9	
						White oak-----------	80	4	
						Sweetgum-----------	90	7	
Un-------------- Una	3W	Slight	Severe	Severe	Moderate	Green ash-----------	75	3	Water tupelo, green ash, sweetgum, baldcypress.
						Sweetgum-----------	90	7	
						Overcup oak---------	---	---	
						Baldcypress---------	---	---	
						Water hickory-------	---	---	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
Vk-------------- Vick	9W	Slight	Moderate	Moderate	Moderate	Loblolly pine------- Shortleaf pine------ Southern red oak---- Water oak----------- Sweetgum------------	87 77 80 86 86	9 9 4 6 7	Loblolly pine, shortleaf pine.
Ze-------------- Zenoria	5W	Slight	Moderate	Moderate	Moderate	Willow oak---------- Nuttall oak--------- Overcup oak--------- Green ash----------- Sweetgum------------	80 --- --- --- 85	5 --- --- --- 6	American sycamore, sweetgum, green ash.

* Productivity class is the yield in cubic meters per hectare per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

TABLE 8.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Ag: Alligator	Severe: flooding, wetness, percs slowly.	Severe: wetness, too clayey, percs slowly.	Severe: too clayey, wetness.	Severe: wetness, too clayey.	Severe: wetness, too clayey.
At: Alligator	Severe: flooding, wetness, percs slowly.	Severe: wetness, too clayey, percs slowly.	Severe: too clayey, wetness, flooding.	Severe: wetness, too clayey.	Severe: wetness, flooding, too clayey.
Bb: Bayoudan	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Slight	Slight.
Bc: Bayoudan	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Slight	Moderate: slope.
Bd: Bayoudan	Severe: slope, percs slowly, too clayey.	Severe: slope, too clayey, percs slowly.	Severe: slope, too clayey, percs slowly.	Severe: too clayey, slope.	Severe: slope, too clayey.
Be: Bienville	Severe: flooding.	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.	Moderate: droughty.
Br, Bs: Bursley	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Ch: Cahaba	Severe: flooding.	Slight	Moderate: slope.	Slight	Slight.
Da, Db: Deerford	Severe: flooding, wetness, excess sodium.	Severe: wetness, excess sodium.	Severe: wetness, excess sodium.	Severe: wetness.	Severe: excess sodium, wetness.
Dd: Dundee	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
Fa: Falkner	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
Fc: Fausse	Severe: flooding, ponding, percs slowly.	Severe: ponding, too clayey, percs slowly.	Severe: too clayey, ponding, flooding.	Severe: ponding, too clayey.	Severe: ponding, flooding, too clayey.
Fe: Foley	Severe: flooding, wetness, percs slowly.	Severe: wetness, excess sodium, percs slowly.	Severe: wetness, percs slowly, excess sodium.	Severe: wetness.	Severe: excess sodium, wetness.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Ff, Fh----------------- Forestdale	Severe: flooding, wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
Fr--------------------- Frizzell	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
Go--------------------- Gore	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Severe: erodes easily.	Moderate: slope.
Gu--------------------- Guyton	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
GY:					
Guyton----------------	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
Ouachita--------------	Severe: flooding.	Moderate: flooding, percs slowly.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
Hw--------------------- Hollywood	Severe: percs slowly, too clayey.	Severe: too clayey, percs slowly.	Severe: too clayey, percs slowly.	Severe: too clayey.	Severe: too clayey.
Ke--------------------- Keithville	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Slight-----------	Slight.
Ks:					
Kisatchie-------------	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Moderate: slope.	Severe: slope.
Oula------------------	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Moderate: slope.	Severe: slope.
Ku--------------------- Kurth	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight-----------	Slight.
Le--------------------- Lexington	Slight-----------	Slight-----------	Moderate: slope.	Slight-----------	Slight.
Lf--------------------- Libuse	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Moderate: wetness.	Slight.
Mb--------------------- Malbis	Slight-----------	Slight-----------	Moderate: slope.	Slight-----------	Slight.
OE:					
Ouachita--------------	Severe: flooding.	Moderate: flooding, percs slowly.	Severe: flooding.	Moderate: flooding.	Severe: flooding.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
OE:					
Jena	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
Ou: Oula	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Slight	Moderate: slope.
Pb: Pheba	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
Pg. Pits					
Pr: Providence	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
Pv: Providence	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Severe: slope.	Moderate: wetness.	Moderate: wetness.
Rs, Rt: Ruston	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
Sa: Sacul	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight	Slight.
Sb: Sacul	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope.
Sf: Savannah	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Moderate: wetness.	Moderate: wetness, droughty.
Sh: Sharkey	Severe: flooding, wetness, percs slowly.	Severe: wetness, too clayey, percs slowly.	Severe: too clayey, wetness, flooding.	Severe: wetness, too clayey.	Severe: wetness, flooding, too clayey.
Sk: Shatta	Moderate: percs slowly, wetness.	Moderate: percs slowly, wetness.	Moderate: slope, percs slowly, wetness.	Moderate: wetness.	Moderate: wetness.
Sm: Smithdale	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Te: Tensas	Severe: flooding, wetness, percs slowly.	Severe: too clayey, percs slowly.	Severe: too clayey, wetness.	Severe: too clayey.	Severe: too clayey.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Tp-------------------- Tippah	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Slight----------	Slight.
Un-------------------- Una	Severe: flooding, wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
Vk-------------------- Vick	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
Ze-------------------- Zenoria	Severe: flooding, too clayey.	Severe: too clayey.	Severe: too clayey.	Severe: too clayey.	Moderate: flooding, wetness.

TABLE 9.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Map symbol and soil name	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Ag----------------- Alligator	Fair	Fair	Fair	Fair	---	Fair	Good	Good	Fair	Fair	Good.
At----------------- Alligator	Poor	Poor	Fair	Fair	---	Fair	Good	Good	Poor	Fair	Good.
Bb, Bc, Bd--------- Bayoudan	Poor	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Be----------------- Bienville	Fair	Fair	Fair	Fair	Good	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Br, Bs------------- Bursley	Good	Good	Good	Good	---	Good	Good	Fair	Good	Good	Fair.
Ch----------------- Cahaba	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Da, Db------------- Deerford	Fair	Good	Good	Good	Good	Fair	Fair	Fair	Good	Good	Fair.
Dd----------------- Dundee	Good	Good	Good	Good	---	Good	Fair	Fair	Good	Good	Fair.
Fa----------------- Falkner	Good	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Fc----------------- Fausse	Very poor.	Very poor.	Very poor.	Poor	---	Poor	Good	Good	Very poor.	Poor	Good.
Fe----------------- Foley	Fair	Fair	Fair	Fair	---	Fair	Good	Good	Fair	Fair	Good.
Ff----------------- Forestdale	Fair	Fair	Good	Fair	---	Good	Good	Good	Fair	Fair	Good.
Fh----------------- Forestdale	Fair	Fair	Fair	Fair	---	Fair	Good	Good	Fair	Fair	Good.
Fr----------------- Frizzell	Fair	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Go----------------- Gore	Poor	Good	Good	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Gu----------------- Guyton	Fair	Fair	Fair	Fair	Fair	Good	Good	Good	Fair	Fair	Good.
GY: Guyton------------	Poor	Fair	Fair	Fair	---	Fair	Good	Good	Poor	Fair	Good.
Ouachita----------	Poor	Fair	Fair	Good	Poor	Fair	Good	Fair	Fair	Good	Fair.

TABLE 9.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
Hw----------------- Hollywood	Fair	Fair	Fair	Good	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
Ke----------------- Keithville	Good	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Ks:											
Kisatchie---------	Poor	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Oula--------------	Poor	Fair	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Ku----------------- Kurth	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Le----------------- Lexington	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Lf----------------- Libuse	Good	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Mb----------------- Malbis	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
OE:											
Ouachita----------	Poor	Fair	Fair	Good	Fair	Fair	Good	Fair	Fair	Good	Fair.
Jena--------------	Poor	Fair	Fair	Good	Fair	Fair	Poor	Poor	Fair	Good	Poor.
Ou----------------- Oula	Poor	Fair	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Pb----------------- Pheba	Fair	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Pg. Pits											
Pr----------------- Providence	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Pv----------------- Providence	Fair	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Rs----------------- Ruston	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Rt----------------- Ruston	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Sa----------------- Sacul	Good	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Sb----------------- Sacul	Poor	Good	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Sf----------------- Savannah	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

TABLE 9.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba-ceous plants	Hard-wood trees	Conif-erous plants	Shrubs	Wetland plants	Shallow water areas	Open-land wild-life	Wood-land wild-life	Wetland wild-life
Sh------------------ Sharkey	Poor	Poor	Fair	Fair	---	Poor	Fair	Fair	Poor	Fair	Fair.
Sk------------------ Shatta	Good	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Sm------------------ Smithdale	Poor	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Te------------------ Tensas	Fair	Fair	Fair	Good	---	Good	Good	Good	Poor	Good	Good.
Tp------------------ Tippah	Good	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Un------------------ Una	Poor	Fair	Fair	Fair	---	Fair	Good	Good	Fair	Fair	Good.
Vk------------------ Vick	Fair	Good	Good	Good	Fair	Good	Fair	Fair	Fair	Good	Fair.
Ze------------------ Zenoria	Poor	Fair	Fair	Fair	---	Fair	Fair	Fair	Poor	Fair	Fair.

TABLE 10.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Ag---------------- Alligator	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: shrink-swell, low strength, wetness.	Severe: wetness, too clayey.
At---------------- Alligator	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: shrink-swell, low strength, wetness.	Severe: wetness, flooding, too clayey.
Bb---------------- Bayoudan	Severe: cutbanks cave.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: slippage, low strength, shrink-swell.	Slight.
Bc---------------- Bayoudan	Severe: cutbanks cave.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: slippage, low strength, shrink-swell.	Moderate: slope.
Bd---------------- Bayoudan	Severe: slope, cutbanks cave.	Severe: shrink-swell, slope.	Severe: shrink-swell, slope.	Severe: low strength, slope, slippage.	Severe: slope, too clayey.
Be---------------- Bienville	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Moderate: droughty.
Br, Bs------------ Bursley	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: low strength, wetness.	Severe: wetness.
Ch---------------- Cahaba	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Slight.
Da---------------- Deerford	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness.	Severe: excess sodium, wetness.
Db---------------- Deerford	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: excess sodium, wetness.
Dd---------------- Dundee	Severe: wetness.	Moderate: wetness, shrink-swell.	Moderate: wetness, shrink-swell.	Severe: low strength.	Moderate: wetness.
Fa---------------- Falkner	Severe: wetness.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Moderate: wetness.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Fc---------------- Fausse	Severe: ponding.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: low strength, ponding, flooding.	Severe: ponding, flooding, too clayey.
Fe---------------- Foley	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: excess sodium, wetness.
Ff---------------- Forestdale	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, shrink-swell, wetness.	Severe: wetness.
Fh---------------- Forestdale	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, flooding, shrink-swell.	Severe: wetness.
Fr---------------- Frizzell	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
Go---------------- Gore	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.	Moderate: slope.
Gu---------------- Guyton	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness.	Severe: wetness.
GY:					
Guyton-----------	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
Ouachita----------	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding.	Severe: flooding.
Hw---------------- Hollywood	Severe: cutbanks cave.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Severe: too clayey.
Ke---------------- Keithville	Severe: wetness.	Moderate: wetness.	Moderate: wetness, slope.	Moderate: low strength, wetness.	Slight.
Ks:					
Kisatchie--------	Severe: slope.	Severe: shrink-swell, slope.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength, slope.	Severe: slope.
Oula-------------	Severe: slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.	Severe: slope.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Ku----------------- Kurth	Moderate: wetness.	Slight-----------	Moderate: slope.	Slight-----------	Slight.
Le----------------- Lexington	Severe: cutbanks cave.	Slight-----------	Slight-----------	Severe: low strength.	Slight.
Lf----------------- Libuse	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Severe: low strength.	Moderate: wetness.
Mb----------------- Malbis	Moderate: wetness.	Slight-----------	Slight-----------	Slight-----------	Slight.
OE:					
Ouachita----------	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding.	Severe: flooding.
Jena--------------	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
Ou----------------- Oula	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.	Moderate: slope.
Pb----------------- Pheba	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Severe: low strength.	Moderate: wetness.
Pg. Pits					
Pr----------------- Providence	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Severe: low strength.	Moderate: wetness.
Pv----------------- Providence	Severe: wetness.	Moderate: wetness.	Moderate: wetness, slope.	Severe: low strength.	Moderate: wetness.
Rs----------------- Ruston	Slight-----------	Slight-----------	Slight-----------	Moderate: low strength.	Slight.
Rt----------------- Ruston	Slight-----------	Slight-----------	Moderate: slope.	Moderate: low strength.	Slight.
Sa----------------- Sacul	Moderate: too clayey, wetness.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Slight.
Sb----------------- Sacul	Moderate: too clayey, slope, wetness.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.	Moderate: slope.
Sf----------------- Savannah	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: low strength, wetness.	Moderate: wetness, droughty.
Sh----------------- Sharkey	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding, too clayey.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Sk----------------- Shatta	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Severe: low strength, wetness.	Moderate: wetness.
Sm----------------- Smithdale	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Te----------------- Tensas	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, flooding.	Severe: too clayey.
Tp----------------- Tippah	Severe: wetness.	Moderate: wetness, shrink-swell.	Moderate: wetness, shrink-swell.	Severe: low strength.	Slight.
Un----------------- Una	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: shrink-swell, low strength, wetness.	Severe: wetness, flooding.
Vk----------------- Vick	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, low strength, shrink-swell.	Severe: wetness.
Ze----------------- Zenoria	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.	Moderate: flooding, wetness.

TABLE 11.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Ag, At: Alligator	Severe: flooding, wetness, percs slowly.	Severe: flooding.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
Bb: Bayoudan	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
Bc: Bayoudan	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
Bd: Bayoudan	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
Be: Bienville	Moderate: flooding, wetness.	Severe: seepage.	Severe: seepage, wetness.	Severe: seepage.	Fair: too sandy.
Br, Bs: Bursley	Severe: wetness, percs slowly.	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Ch: Cahaba	Moderate: flooding.	Severe: seepage.	Severe: seepage.	Moderate: flooding.	Fair: thin layer.
Da: Deerford	Severe: wetness, percs slowly.	Slight	Severe: wetness, excess sodium.	Severe: wetness.	Poor: wetness, excess sodium.
Db: Deerford	Severe: flooding, wetness, percs slowly.	Severe: flooding.	Severe: flooding, wetness, excess sodium.	Severe: flooding, wetness.	Poor: wetness, excess sodium.
Dd: Dundee	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.
Fa: Falkner	Severe: wetness, percs slowly.	Slight	Severe: wetness, too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
Fc: Fausse	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding, too clayey.	Severe: flooding, ponding.	Poor: too clayey, hard to pack, ponding.
Fe: Foley	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness, excess sodium.	Severe: flooding, wetness.	Poor: hard to pack, wetness, excess sodium.

TABLE 11.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Ff: Forestdale	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Severe: wetness.	Poor: wetness.
Fh: Forestdale	Severe: flooding, wetness, percs slowly.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
Fr: Frizzell	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.
Go: Gore	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
Gu: Guyton	Severe: wetness, percs slowly.	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
GY:					
Guyton	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
Ouachita	Severe: flooding, percs slowly.	Severe: flooding.	Severe: flooding, seepage.	Severe: flooding.	Fair: too clayey.
Hw: Hollywood	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
Ke: Keithville	Severe: wetness, percs slowly.	Severe: wetness.	Moderate: wetness, too clayey.	Moderate: wetness.	Poor: thin layer.
Ks:					
Kisatchie	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, hard to pack.
Oula	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
Ku: Kurth	Severe: wetness, percs slowly.	Severe: wetness.	Severe: depth to rock.	Moderate: depth to rock, wetness.	Fair: depth to rock, wetness.
Le: Lexington	Moderate: percs slowly.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: too clayey.

TABLE 11.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Lf------------------ Libuse	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey, wetness.
Mb------------------ Malbis	Severe: wetness, percs slowly.	Moderate: seepage, slope.	Moderate: wetness.	Moderate: wetness.	Fair: wetness.
OE:					
Ouachita-----------	Severe: flooding, percs slowly.	Severe: flooding.	Severe: flooding, seepage.	Severe: flooding.	Fair: too clayey.
Jena---------------	Severe: flooding.	Severe: seepage, flooding.	Severe: flooding, seepage.	Severe: flooding, seepage.	Fair: too sandy.
Ou------------------ Oula	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
Pb------------------ Pheba	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey, wetness.
Pg. Pits					
Pr, Pv-------------- Providence	Severe: wetness, percs slowly.	Moderate: wetness, slope.	Severe: wetness.	Moderate: wetness.	Fair: too clayey, wetness.
Rs, Rt-------------- Ruston	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----------	Fair: too clayey.
Sa------------------ Sacul	Severe: percs slowly, wetness.	Severe: wetness.	Severe: too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
Sb------------------ Sacul	Severe: percs slowly, wetness.	Severe: slope, wetness.	Severe: too clayey.	Moderate: slope, wetness.	Poor: too clayey, hard to pack.
Sf------------------ Savannah	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey, wetness.
Sh------------------ Sharkey	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
Sk------------------ Shatta	Severe: percs slowly, wetness.	Moderate: slope.	Moderate: too clayey, wetness.	Moderate: wetness.	Fair: too clayey, wetness.
Sm------------------ Smithdale	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.

TABLE 11.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Te------------------ Tensas	Severe: flooding, wetness, percs slowly.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
Tp------------------ Tippah	Severe: wetness, percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
Un------------------ Una	Severe: flooding, wetness, percs slowly.	Severe: flooding.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
Vk------------------ Vick	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Ze------------------ Zenoria	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness.	Fair: wetness.

TABLE 12.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
Ag, At----------------- Alligator	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
Bb--------------------- Bayoudan	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Bc--------------------- Bayoudan	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, slope.
Bd--------------------- Bayoudan	Poor: low strength, slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Be--------------------- Bienville	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
Br, Bs----------------- Bursley	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Ch--------------------- Cahaba	Good-----------------	Probable-------------	Improbable: too sandy.	Good.
Da, Db----------------- Deerford	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, excess sodium.
Dd--------------------- Dundee	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Fa--------------------- Falkner	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Fc--------------------- Fausse	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
Fe--------------------- Foley	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, excess sodium.
Ff, Fh----------------- Forestdale	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
Fr--------------------- Frizzell	Fair: thin layer, wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
Go-------------------- Gore	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Gu-------------------- Guyton	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
GY:				
Guyton---------------	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Ouachita-------------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
Hw-------------------- Hollywood	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Ke-------------------- Keithville	Fair: low strength, thin layer, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
Ks:				
Kisatchie------------	Poor: depth to rock, shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Oula-----------------	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Ku-------------------- Kurth	Fair: depth to rock, wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
Le-------------------- Lexington	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Good.
Lf-------------------- Libuse	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Good.
Mb-------------------- Malbis	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
OE:				
Ouachita-------------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
Jena-----------------	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Good.
Ou-------------------- Oula	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
Pb: Pheba	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
Pg. Pits				
Pr, Pv: Providence	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
Rs, Rt: Ruston	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
Sa, Sb: Sacul	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Sf: Savannah	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
Sh: Sharkey	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
Sk: Shatta	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
Sm: Smithdale	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Te: Tensas	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Tp: Tippah	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, thin layer.
Un: Una	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
Vk: Vick	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Ze: Zenoria	Fair: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.

TABLE 13.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Features affecting-- Drainage	Features affecting-- Irrigation	Features affecting-- Terraces and diversions	Features affecting-- Grassed waterways
Ag, At Alligator	Slight	Severe: hard to pack, wetness.	Percs slowly, flooding.	Wetness, slow intake.	Wetness, percs slowly.	Wetness, percs slowly.
Bb Bayoudan	Moderate: slope.	Severe: hard to pack.	Deep to water	Percs slowly, slope.	Percs slowly	Percs slowly.
Bc Bayoudan	Severe: slope.	Severe: hard to pack.	Deep to water	Percs slowly, slope.	Slope, percs slowly.	Slope, percs slowly.
Bd Bayoudan	Severe: slope.	Severe: hard to pack.	Deep to water	Slow intake, percs slowly, slope.	Slope, percs slowly.	Slope, percs slowly.
Be Bienville	Severe: seepage.	Severe: piping, seepage.	Deep to water	Droughty, fast intake.	Favorable	Droughty.
Br, Bs Bursley	Moderate: seepage.	Severe: wetness.	Favorable	Wetness, erodes easily.	Erodes easily, wetness.	Wetness, erodes easily.
Ch Cahaba	Severe: seepage.	Moderate: thin layer, piping.	Deep to water	Slope	Favorable	Favorable.
Da Deerford	Slight	Severe: wetness, excess sodium.	Percs slowly, excess sodium.	Wetness, percs slowly, rooting depth.	Erodes easily, wetness, percs slowly.	Wetness, excess sodium, erodes easily.
Db Deerford	Slight	Severe: wetness, excess sodium.	Percs slowly, flooding, excess sodium.	Wetness, percs slowly, rooting depth.	Erodes easily, wetness, percs slowly.	Wetness, excess sodium, erodes easily.
Dd Dundee	Moderate: seepage.	Severe: piping, wetness.	Favorable	Wetness	Erodes easily, wetness.	Erodes easily.
Fa Falkner	Slight	Severe: hard to pack.	Percs slowly	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Erodes easily, percs slowly.
Fc Fausse	Slight	Severe: hard to pack, ponding.	Ponding, percs slowly, flooding.	Ponding, slow intake, percs slowly.	Ponding, percs slowly.	Wetness, percs slowly.
Fe Foley	Slight	Severe: wetness, excess sodium.	Percs slowly, flooding, excess sodium.	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.	Wetness, excess sodium, erodes easily.
Ff Forestdale	Slight	Severe: piping, wetness.	Percs slowly	Wetness, percs slowly.	Erodes easily, wetness.	Wetness, erodes easily, percs slowly.

TABLE 13.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
Fh-----------------Forestdale	Slight----------	Severe: piping, wetness.	Percs slowly, flooding.	Wetness, percs slowly.	Erodes easily, wetness.	Wetness, erodes easily, percs slowly.
Fr-----------------Frizzell	Moderate: seepage.	Severe: piping, wetness.	Percs slowly---	Wetness, percs slowly, erodes easily.	Erodes easily, wetness.	Erodes easily, percs slowly.
Go-----------------Gore	Severe: slope.	Moderate: hard to pack.	Deep to water	Percs slowly, slope.	Slope, erodes easily, percs slowly.	Slope, erodes easily.
Gu-----------------Guyton	Moderate: seepage.	Severe: piping, wetness.	Percs slowly---	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
GY:						
Guyton------------	Moderate: seepage.	Severe: piping, wetness.	Percs slowly, flooding.	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
Ouachita----------	Slight----------	Severe: piping.	Deep to water	Erodes easily, flooding.	Erodes easily	Percs slowly.
Hw-----------------Hollywood	Moderate: slope.	Severe: hard to pack.	Deep to water	Slow intake, percs slowly, slope.	Erodes easily, percs slowly.	Erodes easily, percs slowly.
Ke-----------------Keithville	Moderate: slope.	Moderate: piping, wetness.	Percs slowly, slope.	Wetness, percs slowly, slope.	Erodes easily, wetness.	Erodes easily, percs slowly.
Ks:						
Kisatchie---------	Severe: slope.	Severe: thin layer.	Deep to water	Slope, percs slowly, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
Oula--------------	Severe: slope.	Moderate: hard to pack.	Deep to water	Percs slowly, slope.	Slope, erodes easily, percs slowly.	Slope, erodes easily, percs slowly.
Ku-----------------Kurth	Moderate: depth to rock, seepage.	Moderate: piping, wetness.	Percs slowly, slope.	Wetness, percs slowly, slope.	Erodes easily, wetness.	Erodes easily, percs slowly.
Le-----------------Lexington	Severe: seepage.	Severe: thin layer.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
Lf-----------------Libuse	Moderate: seepage, slope.	Moderate: thin layer, piping.	Deep to water	Percs slowly, rooting depth, slope.	Erodes easily, rooting depth.	Erodes easily, rooting depth.
Mb-----------------Malbis	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope-----------	Favorable-------	Favorable.
OE:						
Ouachita----------	Slight----------	Severe: piping.	Deep to water	Erodes easily, flooding.	Erodes easily	Percs slowly.

TABLE 13.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
OE:						
Jena	Severe: seepage.	Severe: piping, seepage.	Deep to water	Droughty, flooding.	Favorable	Droughty.
Ou Oula	Severe: slope.	Moderate: hard to pack.	Deep to water	Percs slowly, slope.	Slope, percs slowly.	Slope, percs slowly.
Pb Pheba	Moderate: seepage.	Moderate: piping, wetness.	Favorable	Wetness, rooting depth, erodes easily.	Erodes easily, wetness, rooting depth.	Erodes easily, rooting depth.
Pg. Pits						
Pr, Pv Providence	Moderate: seepage, slope.	Moderate: thin layer, piping, wetness.	Slope	Wetness, rooting depth, slope.	Erodes easily, wetness.	Erodes easily, rooting depth.
Rs Ruston	Moderate: seepage.	Severe: thin layer.	Deep to water	Favorable	Favorable	Favorable.
Rt Ruston	Moderate: seepage, slope.	Severe: thin layer.	Deep to water	Slope	Favorable	Favorable.
Sa Sacul	Slight	Severe: hard to pack.	Deep to water	Percs slowly, wetness.	Percs slowly, wetness.	Percs slowly.
Sb Sacul	Slight	Severe: hard to pack.	Deep to water	Slope, percs slowly, wetness.	Slope, percs slowly, wetness.	Slope, percs slowly.
Sf Savannah	Moderate: seepage, slope.	Severe: piping.	Slope	Slope, wetness, droughty.	Wetness	Rooting depth.
Sh Sharkey	Slight	Severe: hard to pack, wetness.	Percs slowly, flooding.	Wetness, slow intake, percs slowly.	Wetness, percs slowly.	Wetness.
Sk Shatta	Moderate: slope.	Severe: piping.	Slope, percs slowly.	Percs slowly, wetness, slope.	Erodes easily, wetness, percs slowly.	Erodes easily, rooting depth, percs slowly.
Sm Smithdale	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope	Slope	Slope.
Te Tensas	Moderate: seepage.	Severe: piping, wetness.	Percs slowly, flooding.	Wetness, slow intake, percs slowly.	Erodes easily, wetness.	Wetness, erodes easily.
Tp Tippah	Moderate: seepage, slope.	Moderate: hard to pack, wetness.	Percs slowly, slope.	Wetness, percs slowly, slope.	Erodes easily, wetness.	Erodes easily, percs slowly.
Un Una	Slight	Severe: wetness.	Percs slowly, flooding.	Wetness, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.

TABLE 13.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
Vk---------------- Vick	Slight----------	Severe: wetness.	Percs slowly---	Wetness, percs slowly, erodes easily.	Erodes easily, percs slowly, wetness.	Wetness, percs slowly, erodes easily.
Ze---------------- Zenoria	Severe: seepage.	Severe: wetness.	Percs slowly, flooding.	Slow intake, percs slowly, flooding.	Wetness---------	Favorable.

TABLE 14.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag-ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct					Pct	
Ag------------- Alligator	0-5	Clay-------------	CH	A-7	0	100	100	95-100	95-100	52-75	30-50
	5-60	Silty clay, clay, silty clay loam.	CH	A-7	0	100	100	100	95-100	62-94	33-64
At------------- Alligator	0-4	Clay-------------	CH	A-7	0	100	100	95-100	95-100	52-75	30-50
	4-60	Silty clay, clay, silty clay loam.	CH	A-7	0	100	100	100	95-100	62-94	33-64
Bb------------- Bayoudan	0-3	Silt loam--------	ML-CL	A-4, A-6	0	100	100	90-100	70-90	17-40	5-10
	3-36	Clay-------------	CH	A-7-6	0	100	100	95-100	90-100	75-90	48-60
	36-75	Clay-------------	CH	A-7-6	0	100	100	95-100	90-100	75-90	48-60
Bc------------- Bayoudan	0-5	Silty clay loam	CL, CH	A-7	0	100	100	95-100	85-100	40-90	25-55
	5-20	Clay-------------	CH	A-7-6	0	100	100	95-100	90-100	75-90	48-60
	20-60	Clay-------------	CH	A-7-6	0	100	100	95-100	90-100	75-90	48-60
Bd------------- Bayoudan	0-3	Clay-------------	CL, CH	A-7	0	100	100	95-100	85-100	40-90	25-55
	3-34	Clay-------------	CH	A-7-6	0	100	100	95-100	90-100	75-90	48-60
	34-68	Clay-------------	CH	A-7-6	0	100	100	95-100	90-100	75-90	48-60
Be------------- Bienville	0-37	Loamy fine sand	SM	A-2-4, A-4	0	100	100	90-100	15-50	<25	NP-3
	37-64	Loamy fine sand, fine sandy loam, fine sand.	SM, ML	A-2-4, A-4	0	100	100	90-100	30-55	<25	NP-3
Br------------- Bursley	0-9	Silt loam--------	CL-ML, ML, CL	A-4, A-6	0	100	100	90-100	70-90	20-35	3-15
	9-54	Silt loam, silty clay loam.	CL	A-6	0	100	100	90-100	70-90	27-40	12-20
	54-78	Very fine sandy loam, silt loam, silty clay loam.	CL, CL-ML	A-6, A-4, A-7-6	0	100	100	85-100	60-90	25-43	5-22
Bs------------- Bursley	0-11	Silt loam--------	CL-ML, ML, CL	A-4, A-6	0	100	100	90-100	70-90	20-35	3-15
	11-46	Silt loam, silty clay loam.	CL	A-6	0	100	100	90-100	70-90	27-40	12-20
	46-65	Loam, clay loam, silty clay loam.	CL, CL-ML	A-6, A-4, A-7-6	0	100	100	85-100	60-90	25-43	5-22
Ch------------- Cahaba	0-14	Fine sandy loam	SM	A-4, A-2-4	0	95-100	95-100	65-90	30-45	<28	NP-10
	14-36	Sandy clay loam, loam, clay loam.	SC, CL	A-4, A-6	0	90-100	80-100	75-90	40-75	22-35	8-15
	36-75	Sand, loamy sand, fine sandy loam.	SM, SP-SM	A-2-4	0	95-100	90-100	60-85	10-35	<20	NP-10
Da------------- Deerford	0-9	Silt loam--------	ML, CL-ML	A-4	0	100	100	100	95-100	<28	NP-7
	9-43	Silty clay loam, silt loam, loam.	CL	A-6, A-7-6	0	100	100	100	95-100	32-49	11-25
	43-65	Silt loam, silty clay loam, loam.	CL, CL-ML	A-6, A-4, A-7-6	0	100	100	95-100	95-100	25-49	5-25

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
Db----------------- Deerford	0-10	Silt loam----------	ML, CL-ML	A-4	0	100	100	100	95-100	<28	NP-7
	10-35	Silty clay loam, silt loam.	CL	A-6, A-7-6	0	100	100	100	95-100	32-49	11-25
	35-75	Silt loam, silty clay loam, clay loam.	CL, CL-ML	A-6, A-4, A-7-6	0	100	100	95-100	95-100	25-49	5-25
Dd----------------- Dundee	0-6	Loam---------------	ML, CL-ML	A-4	0	100	100	75-95	51-75	<30	NP-7
	6-33	Silty clay loam, clay loam, sandy clay loam.	CL	A-6, A-7	0	100	100	90-100	70-95	28-44	12-22
	33-60	Loam, very fine sandy loam, silt loam.	CL, CL-ML, ML	A-4	0	100	100	85-100	60-90	<30	NP-8
Fa----------------- Falkner	0-4	Silt loam----------	CL-ML, CL	A-4	0	100	100	95-100	90-100	20-30	5-10
	4-22	Silt loam, silty clay loam.	CL	A-6, A-7	0	100	100	95-100	85-95	30-45	15-30
	22-85	Silty clay, clay, silty clay loam.	CH	A-7	0	100	100	90-100	85-95	51-75	30-50
Fc----------------- Fausse	0-2	Muck---------------	PT	A-8	0	---	---	---	---	---	---
	2-7	Clay, mucky clay	CH, OH, MH	A-7-6	0	100	100	100	95-100	50-100	21-71
	7-41	Clay---------------	CH	A-7-6	0	100	100	100	95-100	60-100	31-71
	41-62	Clay, silty clay, silty clay loam.	CH, MH, CL, ML	A-7-6	0	100	100	100	95-100	45-100	16-71
Fe----------------- Foley	0-7	Silt loam----------	CL, CL-ML	A-4, A-6, A-7	0	100	100	95-100	70-100	25-45	5-20
	7-14	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	95-100	90-100	30-49	11-25
	14-52	Silty clay loam, silt loam.	CL, CH	A-7	0	100	100	95-100	90-100	40-60	18-32
	52-62	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	85-100	30-45	11-20
Ff----------------- Forestdale	0-5	Silty clay loam	CL, CH	A-6, A-7	0	100	100	95-100	90-100	30-58	12-30
	5-36	Silty clay, clay, silty clay loam.	CH, CL	A-7	0	100	100	95-100	90-100	40-65	20-40
	36-60	Silty clay loam, silt loam, very fine sandy loam.	CL, CL-ML	A-6, A-7, A-4	0	100	100	95-100	75-100	20-50	5-30
Fh----------------- Forestdale	0-4	Silty clay loam	CL, CH	A-6, A-7	0	100	100	95-100	90-100	30-58	12-30
	4-39	Silty clay, clay, silty clay loam.	CH, CL	A-7	0	100	100	95-100	90-100	40-65	20-40
	39-65	Silty clay loam, silt loam, very fine sandy loam.	CL, CL-ML	A-6, A-7, A-4	0	100	100	95-100	75-100	20-50	5-30
Fr----------------- Frizzell	0-29	Silt loam----------	CL-ML, ML, CL	A-4	0	100	100	90-100	65-90	<30	NP-10
	29-64	Silty clay loam, silt loam, clay loam.	CL	A-6	0	100	100	90-100	70-95	31-40	11-19
Go----------------- Gore	0-6	Silt loam----------	ML, CL-ML	A-4	0	100	100	95-100	60-90	<27	NP-7
	6-45	Clay, silty clay	CH	A-7-6, A-7-5	0	100	100	95-100	85-100	53-65	28-40
	45-60	Clay, silty clay	CH	A-7-6, A-7-5	0	100	100	95-100	85-100	51-83	25-53

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
Gu----------------- Guyton	0-24	Silt loam--------	ML, CL-ML	A-4	0	100	100	95-100	65-90	<27	NP-7
	24-64	Silt loam, silty clay loam, clay loam.	CL, CL-ML	A-6, A-4	0	100	100	94-100	75-95	22-40	6-18
GY:											
Guyton----------	0-19	Silt loam--------	ML, CL-ML	A-4	0	100	100	95-100	65-90	<27	NP-7
	19-50	Silt loam, silty clay loam, clay loam.	CL, CL-ML	A-6, A-4	0	100	100	94-100	75-95	22-40	6-18
	50-62	Silt loam, silty clay loam, clay loam.	CL, CL-ML, ML	A-6, A-4	0	100	100	95-100	50-95	<40	NP-18
Ouachita--------	0-20	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	100	100	85-100	75-95	<30	NP-12
	20-30	Silt loam, loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6	0	100	100	85-100	80-100	25-40	5-20
	30-70	Silt loam, loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6	0	100	100	85-100	80-100	25-40	5-20
Hw----------------- Hollywood	0-7	Clay-------------	CL	A-6, A-7	0	98-100	98-100	95-100	75-95	25-45	11-25
	7-63	Silty clay, clay	CH	A-7	0	98-100	98-100	95-100	75-95	51-75	25-45
Ke----------------- Keithville	0-12	Very fine sandy loam.	ML, CL-ML	A-4	0	100	100	85-100	50-90	<25	NP-6
	12-38	Silt loam, loam, silty clay loam.	CL	A-6, A-4	0	100	100	90-100	65-95	25-35	8-16
	38-72	Silty clay, clay, sandy clay.	CH, CL	A-7-6	0	100	100	85-100	55-95	41-66	22-38
Ks:											
Kisatchie-------	0-7	Fine sandy loam	SM, SM-SC	A-4	0	100	100	70-85	40-55	<25	NP-4
	7-12	Silty clay, silty clay loam, clay loam.	CH, CL	A-7-6	0	100	100	90-100	85-95	45-65	22-36
	12-26	Silty clay, channery clay loam.	CH, CL	A-7-6	0-5	85-95	65-75	55-65	50-60	45-65	22-36
	26-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Oula------------	0-7	Very fine sandy loam.	ML, CL-ML	A-4	0	100	100	85-100	50-90	<25	NP-7
	7-58	Clay, silty clay	CH	A-7-6	0-5	100	100	90-100	75-95	51-70	25-40
	58-72	Sandy clay, clay, sandy clay loam.	CH, CL, SC	A-6, A-7	0-15	100	100	80-100	35-95	25-70	12-40
Ku----------------- Kurth	0-16	Fine sandy loam	SM, SM-SC	A-2-4, A-4	0	98-100	98-100	85-100	25-50	<30	NP-7
	16-27	Fine sandy loam, clay loam, sandy clay loam.	SC, SM-SC, CL, CL-ML	A-4	0	98-100	96-100	85-100	40-80	20-30	4-10
	27-54	Sandy clay loam, clay loam.	CL	A-6	0	98-100	96-100	85-100	51-80	25-40	11-20
	54-60	Weathered bedrock	---	---	---	---	---	---	---	---	---

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag-ments < 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct					Pct	
Le----------------- Lexington	0-8	Silt loam--------	ML, CL, CL-ML	A-4, A-6, A-7	0	100	95-100	90-100	70-100	25-42	5-16
	8-38	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	95-100	90-100	75-100	27-45	11-25
	38-55	Sandy loam, loam	SC, SM-SC, CL, CL-ML	A-2, A-4, A-6	0	100	95-100	50-85	20-65	22-35	5-15
	55-96	Sandy loam, loam	SC, SM-SC	A-2, A-4, A-6	0	100	95-100	50-70	20-40	22-35	5-15
Lf----------------- Libuse	0-12	Silt loam--------	ML, CL-ML	A-4	0	100	100	85-100	65-90	<30	NP-7
	12-27	Silty clay loam, loam, silt loam.	CL	A-6	0	100	100	85-100	70-90	30-40	12-18
	27-52	Silt loam, loam, silty clay loam.	CL	A-6	0	100	100	85-100	60-90	30-40	12-18
	52-83	Loam, silty clay loam, silt loam.	ML, SM, CL, SC	A-4, A-6	0	100	100	75-95	45-80	20-35	3-16
Mb----------------- Malbis	0-7	Fine sandy loam	SM, ML	A-4	0	100	97-100	91-97	40-62	<30	NP-5
	7-21	Loam, sandy clay loam, clay loam.	CL-ML, CL	A-4, A-6	0	99-100	95-100	80-100	55-70	21-35	5-11
	21-60	Sandy clay loam, clay loam, loam.	ML, CL	A-4, A-6, A-7	0	98-100	96-100	90-100	56-80	29-49	4-15
	60-72	Sandy clay loam, clay loam, loam.	ML, CL	A-4, A-5, A-6, A-7	0	98-100	96-100	90-100	56-80	30-49	4-15
OE: Ouachita--------	0-6	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	100	100	85-100	75-95	<30	NP-12
	6-50	Silt loam, loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6	0	100	100	85-100	80-100	25-40	5-20
	50-60	Loam, silt loam, silty clay loam.	ML, CL-ML	A-4, A-6	0	100	100	85-100	80-100	25-40	5-20
Jena------------	0-5	Very fine sandy loam.	ML, SM, CL-ML, SM-SC	A-4, A-2-4	0	100	100	60-85	25-70	<22	NP-5
	5-47	Silt loam, very fine sandy loam, loam.	SM, ML, CL-ML, SM-SC	A-4, A-2-4	0	100	100	55-90	25-70	<22	NP-5
	47-80	Fine sandy loam, sandy loam, loamy fine sand.	SM	A-2-4, A-4	0	100	100	50-80	20-50	---	NP
Ou----------------- Oula	0-6	Fine sandy loam	SM-SC, SM, ML, CL-ML	A-4, A-2-4	0	98-100	98-100	85-100	30-55	<25	NP-6
	6-38	Clay, silty clay	CH	A-7-6	0-5	100	100	90-100	75-95	51-70	25-40
	38-60	Sandy clay, clay, sandy clay loam.	CH, CL, SC	A-6, A-7	0-15	100	100	80-100	35-95	25-70	12-40
Pb----------------- Pheba	0-8	Loam-------------	ML, CL, CL-ML	A-4	0	100	100	85-100	55-90	<25	NP-8
	8-19	Fine sandy loam, loam, very fine sandy loam.	ML, CL, CL-ML	A-4	0	100	100	90-100	75-90	<25	NP-8
	19-75	Silt loam, loam, silty clay loam.	CL	A-6	0	100	100	90-100	75-95	30-40	11-16
Pg. Pits											

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Pr---------------- Providence	0-8	Silt loam--------	ML, CL, CL-ML	A-4	0	100	100	100	85-100	<30	NP-10
	8-31	Silty clay loam, silt loam.	CL	A-7, A-6	0	100	100	95-100	85-100	30-45	11-20
	31-47	Silt loam, silty clay loam.	CL	A-6	0	100	100	90-100	70-90	25-40	11-20
	47-82	Sandy loam, sandy clay loam, loam.	SM, SC, CL, ML	A-2, A-4	0	100	95-100	60-85	30-80	<30	NP-10
Pv---------------- Providence	0-6	Silt loam--------	ML, CL, CL-ML	A-4	0	100	100	100	85-100	<30	NP-10
	6-32	Silty clay loam, silt loam.	CL	A-7, A-6	0	100	100	95-100	85-100	30-45	11-20
	32-45	Silt loam, silty clay loam.	CL	A-6	0	100	100	90-100	70-90	25-40	11-20
	45-60	Sandy loam, sandy clay loam, loam.	SM, SC, CL, ML	A-2, A-4	0	100	95-100	60-85	30-80	<30	NP-10
Rs---------------- Ruston	0-9	Fine sandy loam	SM, ML	A-4, A-2-4	0	85-100	78-100	65-100	30-75	<20	NP-3
	9-30	Sandy clay loam, loam, clay loam.	SC, CL	A-6	0	85-100	78-100	70-100	36-75	30-40	11-20
	30-38	Fine sandy loam, sandy loam, loamy sand.	SM, ML, CL-ML, SM-SC	A-4, A-2-4	0	85-100	78-100	65-100	30-75	<27	NP-7
	38-75	Sandy clay loam, loam, clay loam.	SC, CL	A-6	0	85-100	78-100	70-100	36-75	30-42	11-20
Rt---------------- Ruston	0-12	Fine sandy loam	SM, ML	A-4, A-2-4	0	85-100	78-100	65-100	30-75	<20	NP-3
	12-40	Sandy clay loam, loam, clay loam.	SC, CL	A-6	0	85-100	78-100	70-100	36-75	30-40	11-20
	40-52	Fine sandy loam, sandy loam, loamy sand.	SM, ML, CL-ML, SM-SC	A-4, A-2-4	0	85-100	78-100	65-100	30-75	<27	NP-7
	52-75	Sandy clay loam, loam, clay loam.	SC, CL	A-6	0	85-100	78-100	70-100	36-75	30-42	11-20
Sa---------------- Sacul	0-9	Fine sandy loam	SM, ML	A-4	0	95-100	90-100	80-100	40-65	<20	NP-3
	9-41	Clay, silty clay	CH, CL	A-7	0	95-100	90-100	85-95	80-90	45-70	20-40
	41-63	Sandy clay loam, loam, clay loam, sandy loam.	CL, CH, SC	A-6, A-7, A-4	0	95-100	90-100	85-100	40-90	25-55	8-32
Sb---------------- Sacul	0-4	Fine sandy loam	SM, ML	A-4	0	95-100	90-100	80-100	40-65	<20	NP-3
	4-37	Clay, silty clay	CH, CL	A-7	0	95-100	90-100	85-95	80-90	45-70	20-40
	37-68	Sandy clay loam, loam, clay loam, sandy loam.	CL, CH, SC	A-6, A-7, A-4	0	95-100	90-100	85-100	40-90	25-55	8-32
Sf---------------- Savannah	0-13	Fine sandy loam	SM, ML	A-2-4, A-4	0	98-100	90-100	60-100	30-65	<25	NP-4
	13-30	Sandy clay loam, clay loam, loam.	CL, SC, CL-ML	A-4, A-6	0	98-100	90-100	80-100	40-80	23-40	7-19
	30-65	Loam, clay loam, sandy clay loam.	CL, SC, CL-ML	A-4, A-6, A-7, A-2	0	94-100	90-100	60-100	30-80	23-43	7-19

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Sh---------------- Sharkey	0-5	Clay--------------	CH, CL	A-7-6, A-7-5	0	100	100	100	95-100	46-85	22-50
	5-54	Clay--------------	CH	A-7-6, A-7-5	0	100	100	100	95-100	56-85	30-50
	54-80	Clay, silty clay loam, silt loam.	CL, CH	A-6, A-7-6, A-7-5	0	100	100	100	95-100	32-85	11-50
Sk---------------- Shatta	0-7	Very fine sandy loam.	ML, CL-ML	A-4	0	100	100	90-100	55-90	23-28	3-7
	7-26	Silty clay loam, loam, silt loam.	CL	A-6	0	100	100	90-100	70-90	30-40	11-18
	26-70	Loam, silt loam, sandy clay loam.	CL	A-6, A-4	0	100	100	90-100	60-90	27-35	8-14
Sm---------------- Smithdale	0-11	Fine sandy loam	SM, SM-SC	A-4, A-2	0	100	85-100	60-95	28-49	<20	NP-5
	11-34	Clay loam, sandy clay loam, loam.	SM-SC, SC, CL, CL-ML	A-6, A-4	0	100	85-100	80-96	45-75	23-38	7-16
	34-85	Loam, sandy loam	SM, ML, CL, SC	A-4	0	100	85-100	65-95	36-70	<30	NP-10
Te---------------- Tensas	0-4	Silty clay--------	CH, CL	A-7-6	0	100	100	100	95-100	46-70	22-40
	4-33	Clay, silty clay	CH	A-7-6	0	100	100	100	95-100	51-75	26-45
	33-88	Very fine sandy loam, loam, silt loam.	CL-ML, CL	A-4, A-6	0	100	100	100	80-100	25-40	5-17
Tp---------------- Tippah	0-5	Silt loam---------	CL, CL-ML	A-4	0	100	100	90-100	70-90	20-30	4-10
	5-24	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	98-100	90-100	85-95	30-45	11-22
	24-70	Silty clay loam, silty clay, clay.	CH	A-7	0	100	99-100	80-100	60-95	50-65	25-40
Un---------------- Una	0-6	Silty clay loam	CH, CL	A-7	0	100	100	90-100	75-95	41-65	20-40
	6-78	Clay, silty clay loam, silty clay.	CH, CL	A-7	0	100	100	90-100	75-95	41-65	20-40
Vk---------------- Vick	0-12	Silt loam---------	ML, CL-ML	A-4	0	100	100	95-100	90-100	<27	NP-7
	12-25	Silt loam, silty clay loam.	CL	A-6, A-7-6	0	100	100	95-100	90-100	32-45	11-22
	25-46	Clay, silty clay, silty clay loam.	CH, CL	A-7-6	0	100	100	95-100	95-100	41-60	20-35
	46-80	Silt loam, loam, silty clay loam.	CL, CL-ML, ML	A-6, A-4, A-7-6	0	100	100	90-100	85-100	25-45	3-20
Ze---------------- Zenoria	0-2	Clay loam---------	CL	A-6, A-7-6	0	100	100	90-100	80-95	35-45	15-22
	2-10	Clay, silty clay, silty clay loam.	CH, CL	A-6, A-7-6	0	100	100	95-100	90-100	43-65	22-35
	10-52	Sandy clay loam, clay loam, loam.	CL, SC	A-4, A-6	0	100	100	80-90	45-75	25-43	7-22
	52-67	Loam, fine sandy loam, very fine sandy loam.	ML, CL, SM, CL-ML	A-4, A-2-4	0	100	100	70-85	40-70	21-30	NP-11
	67-80	Loamy fine sand, fine sand, fine sandy loam.	ML, SM	A-4, A-2-4	0	100	100	60-85	30-55	---	NP

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
Ag----------------	0-5	40-60	1.20-1.50	<0.06	0.12-0.18	4.5-5.5	High----------	0.32	5	1-4
Alligator	5-60	38-85	1.20-1.50	<0.06	0.12-0.18	4.5-7.8	Very high-----	0.24		
At----------------	0-4	40-60	1.20-1.50	<0.06	0.12-0.18	4.5-5.5	High----------	0.32	5	1-4
Alligator	4-60	38-85	1.20-1.50	<0.06	0.12-0.18	4.5-7.8	Very high-----	0.24		
Bb----------------	0-3	5-25	1.30-1.65	0.6-2.0	0.16-0.24	4.5-6.0	Low-----------	0.49	5	.5-5
Bayoudan	3-36	60-90	1.15-1.35	<0.06	0.12-0.18	3.6-5.5	Very high-----	0.32		
	36-75	60-90	1.15-1.35	<0.06	0.12-0.18	3.6-8.4	Very high-----	0.32		
Bc----------------	0-5	30-40	1.30-1.65	0.2-0.6	0.18-0.22	4.5-6.0	High----------	0.37	5	.5-5
Bayoudan	5-20	60-90	1.15-1.35	<0.06	0.12-0.18	3.6-5.5	Very high-----	0.32		
	20-60	60-90	1.15-1.35	<0.06	0.12-0.18	3.6-8.4	Very high-----	0.32		
Bd----------------	0-3	41-80	1.20-1.40	<0.06	0.12-0.18	4.5-6.0	High----------	0.32	5	.5-5
Bayoudan	3-34	60-90	1.15-1.35	<0.06	0.12-0.18	3.6-5.5	Very high-----	0.32		
	34-68	60-90	1.15-1.35	<0.06	0.12-0.18	3.6-8.4	Very high-----	0.32		
Be----------------	0-37	5-15	1.35-1.60	2.0-6.0	0.08-0.11	4.5-6.5	Low-----------	0.20	5	.5-2
Bienville	37-64	5-20	1.35-1.65	2.0-6.0	0.08-0.13	4.5-6.0	Low-----------	0.20		
Br----------------	0-9	12-30	1.30-1.65	0.2-0.6	0.18-0.23	3.6-6.0	Low-----------	0.43	5	.5-5
Bursley	9-54	18-32	1.30-1.65	0.06-0.2	0.15-0.20	4.5-6.0	Moderate------	0.43		
	54-78	15-35	1.30-1.65	0.6-2.0	0.15-0.20	4.5-7.3	Moderate------	0.49		
Bs----------------	0-11	12-30	1.30-1.65	0.2-0.6	0.18-0.23	3.6-6.0	Low-----------	0.43	5	.5-5
Bursley	11-46	18-32	1.30-1.65	0.06-0.2	0.15-0.20	4.5-6.0	Moderate------	0.43		
	46-65	15-35	1.30-1.65	0.6-2.0	0.15-0.20	4.5-7.3	Moderate------	0.49		
Ch----------------	0-14	7-17	1.35-1.60	2.0-6.0	0.10-0.14	4.5-6.0	Low-----------	0.24	5	.5-2
Cahaba	14-36	18-35	1.35-1.60	0.6-2.0	0.12-0.20	4.5-6.0	Low-----------	0.28		
	36-75	4-20	1.40-1.70	2.0-20	0.05-0.10	4.5-6.0	Low-----------	0.24		
Da----------------	0-9	5-27	1.30-1.70	0.6-2.0	0.21-0.23	3.6-6.0	Low-----------	0.49	3	.5-5
Deerford	9-43	10-35	1.30-1.80	0.06-0.2	0.12-0.18	4.5-8.4	Moderate------	0.49		
	43-65	10-35	1.30-1.80	0.2-0.6	0.12-0.18	5.6-8.4	Moderate------	0.49		
Db----------------	0-10	5-27	1.30-1.70	0.6-2.0	0.21-0.23	3.6-6.0	Low-----------	0.49	3	.5-5
Deerford	10-35	10-35	1.30-1.80	0.06-0.2	0.12-0.18	4.5-8.4	Moderate------	0.49		
	35-75	10-35	1.30-1.80	0.2-0.6	0.12-0.18	5.6-8.4	Moderate------	0.49		
Dd----------------	0-6	5-18	1.30-1.65	0.6-2.0	0.15-0.20	4.5-6.0	Low-----------	0.37	5	.5-3
Dundee	6-33	18-34	1.30-1.65	0.2-0.6	0.15-0.20	4.5-6.0	Moderate------	0.32		
	33-60	18-25	1.30-1.65	0.6-2.0	0.15-0.20	4.5-7.3	Low-----------	0.32		
Fa----------------	0-4	5-18	1.40-1.55	0.2-0.6	0.20-0.22	4.5-6.0	Low-----------	0.49	5	.5-3
Falkner	4-22	20-35	1.35-1.55	0.2-0.6	0.19-0.22	4.5-6.0	Moderate------	0.43		
	22-85	38-60	1.40-1.50	0.06-0.2	0.16-0.18	4.5-7.3	High----------	0.24		
Fc----------------	0-2	---	0.05-0.25	>2.0	0.20-0.50	5.6-7.3	Low-----------	----	----	30-85
Fausse	2-7	40-95	0.80-1.45	<0.06	0.18-0.20	5.6-7.3	Very high-----	0.20	5	2-15
	7-41	60-95	1.10-1.45	<0.06	0.18-0.20	6.1-8.4	Very high-----	0.24		
	41-62	35-95	1.10-1.45	<0.2	0.18-0.22	6.6-8.4	Very high-----	0.24		
Fe----------------	0-7	10-20	1.25-1.60	0.6-2.0	0.13-0.24	4.5-6.0	Low-----------	0.43	3	.5-2
Foley	7-14	20-35	1.25-1.50	0.2-0.6	0.18-0.24	5.1-7.3	Moderate------	0.43		
	14-52	20-35	1.25-1.50	<0.06	0.10-0.14	5.1-9.0	Moderate------	0.43		
	52-62	27-38	1.25-1.50	<0.06	0.10-0.14	6.6-9.0	Low-----------	0.49		

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
Ff----------------	0-5	27-38	1.50-1.55	0.2-0.6	0.20-0.22	4.5-6.0	Moderate-----	0.37	5	.5-5
Forestdale	5-36	35-60	1.50-1.60	<0.06	0.14-0.18	4.5-6.0	High---------	0.28		
	36-60	10-35	1.45-1.55	0.2-0.6	0.17-0.22	5.1-7.8	Moderate-----	0.37		
Fh----------------	0-4	27-38	1.50-1.55	0.2-0.6	0.20-0.22	4.5-6.0	Moderate-----	0.37	5	.5-5
Forestdale	4-39	35-60	1.50-1.60	<0.06	0.14-0.18	4.5-6.0	High---------	0.28		
	39-65	10-35	1.45-1.55	0.2-0.6	0.17-0.22	5.1-7.8	Moderate-----	0.37		
Fr----------------	0-29	8-18	1.35-1.65	0.6-2.0	0.15-0.22	4.5-5.5	Low----------	0.49	5	.5-4
Frizzell	29-64	14-30	1.35-1.65	0.06-0.2	0.15-0.20	4.5-5.5	Low----------	0.43		
Go----------------	0-6	5-15	1.30-1.50	0.6-2.0	0.20-0.22	4.5-6.0	Low----------	0.49	5	.5-4
Gore	6-45	40-60	1.20-1.60	<0.06	0.14-0.18	4.5-7.3	High---------	0.32		
	45-60	40-80	1.20-1.60	<0.06	0.14-0.18	4.5-8.4	High---------	0.32		
Gu----------------	0-24	7-25	1.35-1.65	0.6-2.0	0.20-0.23	3.6-6.0	Low----------	0.43	5	.5-2
Guyton	24-64	20-35	1.35-1.70	0.06-0.2	0.15-0.22	3.6-6.0	Low----------	0.37		
GY:										
Guyton-----------	0-19	7-25	1.35-1.65	0.6-2.0	0.20-0.23	3.6-6.0	Low----------	0.43	5	.5-2
	19-50	20-35	1.35-1.70	0.06-0.2	0.15-0.22	3.6-6.0	Low----------	0.37		
	50-62	20-35	1.35-1.70	0.06-2.0	0.15-0.22	3.6-8.4	Low----------	0.37		
Ouachita---------	0-20	8-25	1.25-1.60	0.6-2.0	0.15-0.24	4.5-5.5	Low----------	0.37	5	.5-2
	20-30	18-35	1.25-1.60	0.2-0.6	0.15-0.24	4.5-5.5	Low----------	0.32		
	30-70	15-30	1.25-1.65	0.6-6.0	0.07-0.24	4.5-5.5	Low----------	0.24		
Hw----------------	0-7	40-50	1.20-1.50	0.2-0.6	0.15-0.22	6.1-7.3	Moderate-----	0.32	3	2-8
Hollywood	7-63	40-60	1.20-1.50	<0.06	0.12-0.18	6.6-8.4	High---------	0.37		
Ke----------------	0-12	8-22	1.35-1.65	0.2-2.0	0.15-0.20	3.6-6.0	Low----------	0.49	5	.5-2
Keithville	12-38	18-35	1.35-1.70	0.2-0.6	0.15-0.20	3.6-6.0	Low----------	0.37		
	38-72	35-60	1.20-1.60	<0.06	0.15-0.18	3.6-6.0	High---------	0.32		
Ks:										
Kisatchie--------	0-7	5-20	1.35-1.65	2.0-6.0	0.11-0.15	4.5-5.5	Low----------	0.32	3	.5-2
	7-12	35-55	1.20-1.70	<0.06	0.15-0.18	3.6-5.0	High---------	0.32		
	12-26	27-55	1.20-1.70	<0.06	0.10-0.15	3.6-5.0	High---------	0.32		
	26-60	---	---	---	---	---	-------------	----		
Oula-------------	0-7	10-27	1.35-1.65	0.2-2.0	0.12-0.25	3.6-6.0	Low----------	0.49	5	.5-3
	7-58	40-60	1.20-1.70	<0.06	0.10-0.18	3.6-5.5	High---------	0.32		
	58-72	20-60	1.20-1.70	<0.06	0.10-0.18	3.6-5.5	High---------	0.32		
Ku----------------	0-16	3-10	1.45-1.65	0.6-2.0	0.10-0.15	4.5-6.5	Low----------	0.43	4	.5-2
Kurth	16-27	15-35	1.35-1.65	0.2-0.6	0.11-0.18	4.5-6.0	Low----------	0.37		
	27-54	25-35	1.35-1.65	0.06-0.2	0.15-0.20	3.6-5.5	Moderate-----	0.37		
	54-60	---	---	---	---	---	-------------	----		
Le----------------	0-8	12-30	1.30-1.50	0.6-2.0	0.17-0.22	4.5-6.0	Low----------	0.49	5	.5-2
Lexington	8-38	20-33	1.40-1.55	0.6-2.0	0.16-0.21	4.5-6.0	Low----------	0.43		
	38-55	15-27	1.30-1.50	2.0-6.0	0.06-0.12	4.5-6.0	Low----------	0.24		
	55-96	9-27	1.20-1.55	2.0-6.0	0.05-0.10	4.5-6.0	Low----------	0.24		
Lf----------------	0-12	5-15	1.35-1.65	0.6-2.0	0.18-0.22	5.1-6.5	Low----------	0.49	3	.5-4
Libuse	12-27	18-32	1.35-1.70	0.2-0.6	0.18-0.22	4.5-6.0	Low----------	0.37		
	27-52	18-35	1.45-1.80	0.06-0.2	0.10-0.14	4.5-5.5	Low----------	0.37		
	52-83	8-32	1.35-1.75	0.2-2.0	0.14-0.18	4.5-6.0	Low----------	0.43		

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
Mb: Malbis	0-7	10-25	1.30-1.60	0.6-2.0	0.10-0.15	4.5-6.0	Low	0.24	5	.5-5
	7-21	18-33	1.30-1.70	0.6-2.0	0.12-0.20	4.5-5.5	Low	0.28		
	21-60	20-35	1.40-1.60	0.6-2.0	0.12-0.17	4.5-5.5	Low	0.28		
	60-72	20-35	1.45-1.70	0.2-0.6	0.06-0.12	4.5-5.5	Low	0.28		
OE:										
Ouachita	0-6	8-25	1.25-1.60	0.6-2.0	0.15-0.24	4.5-5.5	Low	0.37	5	.5-3
	6-50	18-35	1.25-1.60	0.2-0.6	0.15-0.24	4.5-5.5	Low	0.32		
	50-60	15-30	1.25-1.65	0.6-6.0	0.07-0.24	4.5-5.5	Low	0.24		
Jena	0-5	10-20	1.30-1.70	0.6-2.0	0.12-0.20	4.5-6.0	Low	0.28	5	.5-2
	5-47	10-18	1.40-1.80	0.6-2.0	0.10-0.20	4.5-5.5	Low	0.28		
	47-80	5-20	1.35-1.65	2.0-6.0	0.08-0.14	4.5-5.5	Low	0.24		
Ou: Oula	0-6	27-50	1.30-1.70	0.06-0.2	0.15-0.20	3.6-6.0	Low	0.32	5	.5-3
	6-38	40-60	1.20-1.70	<0.06	0.10-0.18	3.6-5.5	High	0.32		
	38-60	20-60	1.20-1.70	<0.06	0.10-0.18	3.6-5.5	High	0.32		
Pb: Pheba	0-8	5-15	1.35-1.45	0.6-2.0	0.16-0.22	3.6-5.5	Low	0.43	3	.5-3
	8-19	10-18	1.45-1.55	0.6-2.0	0.16-0.22	3.6-5.5	Low	0.49		
	19-75	10-35	1.65-1.80	0.2-0.6	0.05-0.10	3.6-5.5	Low	0.43		
Pg. Pits										
Pr: Providence	0-8	5-12	1.30-1.40	0.6-2.0	0.20-0.22	4.5-6.0	Low	0.49	3	.5-4
	8-31	18-30	1.40-1.50	0.6-2.0	0.20-0.22	4.5-6.0	Low	0.43		
	31-47	12-25	1.40-1.60	0.2-0.6	0.08-0.10	4.5-6.0	Low	0.32		
	47-82	10-30	1.40-1.60	0.6-2.0	0.10-0.15	4.5-6.0	Low	0.32		
Pv: Providence	0-6	5-12	1.30-1.40	0.6-2.0	0.20-0.22	4.5-6.0	Low	0.49	3	.5-4
	6-32	18-30	1.40-1.50	0.6-2.0	0.20-0.22	4.5-6.0	Low	0.43		
	32-45	20-30	1.40-1.60	0.2-0.6	0.08-0.10	4.5-6.0	Low	0.32		
	45-60	10-30	1.40-1.60	0.6-2.0	0.10-0.15	4.5-6.0	Low	0.32		
Rs: Ruston	0-9	5-20	1.30-1.70	0.6-2.0	0.09-0.16	4.5-6.5	Low	0.28	5	.5-2
	9-30	18-35	1.30-1.70	0.6-2.0	0.12-0.17	4.5-6.0	Low	0.28		
	30-38	10-20	1.30-1.70	0.6-2.0	0.12-0.15	4.5-6.0	Low	0.32		
	38-75	15-38	1.40-1.70	0.6-2.0	0.12-0.17	4.5-6.0	Low	0.28		
Rt: Ruston	0-12	5-20	1.30-1.70	0.6-2.0	0.09-0.16	4.5-6.5	Low	0.28	5	.5-2
	12-40	18-35	1.30-1.70	0.6-2.0	0.12-0.17	4.5-6.0	Low	0.28		
	40-52	10-20	1.30-1.70	0.6-2.0	0.12-0.15	4.5-6.0	Low	0.32		
	52-75	15-38	1.40-1.70	0.6-2.0	0.12-0.17	4.5-6.0	Low	0.28		
Sa: Sacul	0-9	5-25	1.30-1.50	0.6-2.0	0.10-0.20	4.5-5.5	Low	0.32	5	.5-3
	9-41	40-60	1.20-1.35	0.06-0.2	0.12-0.18	3.6-5.5	High	0.32		
	41-63	20-40	1.25-1.45	0.2-0.6	0.16-0.24	3.6-5.5	Moderate	0.37		
Sb: Sacul	0-4	5-25	1.30-1.50	0.6-2.0	0.10-0.20	4.5-5.5	Low	0.32	5	.5-3
	4-37	40-60	1.20-1.35	0.06-0.2	0.12-0.18	3.6-5.5	High	0.32		
	37-68	20-40	1.25-1.45	0.2-0.6	0.16-0.24	3.6-5.5	Moderate	0.37		
Sf: Savannah	0-13	3-16	1.45-1.65	0.6-2.0	0.10-0.15	3.6-5.5	Low	0.28	3	.5-3
	13-30	18-32	1.55-1.75	0.6-2.0	0.13-0.20	3.6-5.5	Low	0.28		
	30-65	18-32	1.60-1.80	0.2-0.6	0.05-0.10	3.6-5.5	Low	0.24		

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
Sh-----------------Sharkey	0-5	40-60	1.20-1.50	<0.06	0.12-0.18	4.5-6.0	Very high----	0.32	5	.5-5
	5-54	50-90	1.20-1.50	<0.06	0.12-0.18	4.5-8.4	Very high----	0.28		
	54-80	25-90	1.20-1.65	0.06-0.2	0.12-0.18	6.6-8.4	High---------	0.28		
Sk-----------------Shatta	0-7	5-20	1.35-1.60	0.6-2.0	0.18-0.22	4.5-6.0	Low----------	0.49	3	.5-5
	7-26	18-30	1.35-1.65	0.2-0.6	0.18-0.22	4.5-6.0	Low----------	0.37		
	26-70	15-30	1.50-1.85	0.06-0.2	0.08-0.12	4.5-6.0	Low----------	0.37		
Sm-----------------Smithdale	0-11	2-15	1.40-1.50	2.0-6.0	0.14-0.16	4.5-5.5	Low----------	0.28	5	.5-3
	11-34	18-33	1.40-1.55	0.6-2.0	0.15-0.17	4.5-5.5	Low----------	0.24		
	34-85	12-27	1.40-1.55	2.0-6.0	0.14-0.16	4.5-5.5	Low----------	0.28		
Te-----------------Tensas	0-4	40-60	1.20-1.50	<0.06	0.12-0.18	4.5-6.0	High---------	0.32	5	.5-5
	4-33	40-60	1.20-1.50	<0.06	0.12-0.18	4.5-6.0	Very high----	0.32		
	33-88	10-39	1.30-1.65	0.2-2.0	0.20-0.23	5.1-7.3	Low----------	0.37		
Tp-----------------Tippah	0-5	5-20	1.35-1.45	0.6-2.0	0.20-0.22	4.5-6.0	Low----------	0.49	5	.5-3
	5-24	20-35	1.40-1.50	0.6-2.0	0.19-0.21	4.5-6.0	Moderate-----	0.43		
	24-70	30-55	1.20-1.55	0.06-0.2	0.16-0.18	4.5-6.0	High---------	0.24		
Un-----------------Una	0-6	28-45	1.40-1.60	<0.06	0.15-0.20	4.5-5.5	High---------	0.32	5	.5-3
	6-78	28-55	1.40-1.60	<0.06	0.15-0.20	4.5-5.5	High---------	0.28		
Vk-----------------Vick	0-12	8-20	1.35-1.65	0.6-2.0	0.21-0.23	4.5-6.0	Low----------	0.49	5	.5-2
	12-25	15-35	1.35-1.65	0.2-0.6	0.15-0.20	4.5-6.0	Low----------	0.43		
	25-46	35-55	1.20-1.60	0.06-0.2	0.15-0.18	4.5-6.0	High---------	0.32		
	46-80	15-35	1.35-1.65	0.2-0.6	0.15-0.20	5.1-7.3	Low----------	0.37		
Ze-----------------Zenoria	0-2	27-38	1.35-1.65	0.2-0.6	0.18-0.22	3.6-5.5	Moderate-----	0.37	5	.5-4
	2-10	35-55	1.20-1.50	0.06-0.2	0.12-0.18	3.6-5.5	High---------	0.32		
	10-52	15-35	1.35-1.65	0.2-0.6	0.15-0.20	3.6-5.5	Moderate-----	0.28		
	52-67	10-20	1.35-1.65	0.6-2.0	0.12-0.20	3.6-5.5	Low----------	0.28		
	67-80	2-10	1.35-1.65	6.0-20	0.08-0.14	3.6-5.5	Low----------	0.17		

TABLE 16.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Map symbol and soil name	Hydrologic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft				
Ag: Alligator	D	Occasional	Brief to very long.	Jan-Apr	0.5-2.0	Apparent	Jan-Apr	High	Moderate.
At: Alligator	D	Frequent	Brief to very long.	Jan-Apr	0.5-2.0	Apparent	Jan-Apr	High	Moderate.
Bd, Bb, Bc: Bayoudan	D	None	---	---	>6.0	---	---	High	High.
Be: Bienville	A	Rare	---	---	4.0-6.0	Apparent	Dec-Apr	Moderate	Moderate.
Br: Bursley	D	Rare	---	---	0.5-3.0	Perched	Dec-Jun	High	Moderate.
Bs: Bursley	D	Occasional	Long to very long.	Dec-Jun	0.5-3.0	Perched	Dec-Jun	High	Moderate.
Ch: Cahaba	B	Rare	---	---	>6.0	---	---	Moderate	Moderate.
Da: Deerford	D	Rare	---	---	0.5-1.5	Perched	Dec-Apr	High	Moderate.
Db: Deerford	D	Occasional	Brief to very long.	Nov-Jun	0.5-1.5	Perched	Dec-Apr	High	Moderate.
Dd: Dundee	C	None	---	---	1.5-3.5	Apparent	Jan-Apr	High	Moderate.
Fa: Falkner	C	None	---	---	1.5-2.5	Perched	Jan-Mar	High	Moderate.
Fc: Fausse	D	Frequent	Very long	Jan-Dec	+1.-1.5	Apparent	Jan-Dec	High	Low.
Fe: Foley	D	Occasional	Brief to very long.	Dec-May	0-1.0	Perched	Dec-Apr	High	Low.
Ff: Forestdale	D	Rare	---	---	0.5-2.0	Apparent	Jan-Apr	High	Moderate.
Fh: Forestdale	D	Occasional	Brief to very long.	Jan-Apr	0.5-2.0	Apparent	Jan-Apr	High	Moderate.
Fr: Frizzell	C	None	---	---	1.5-4.0	Apparent	Dec-Apr	High	High.
Go: Gore	D	None	---	---	>6.0	---	---	High	Low.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Map symbol and soil name	Hydrologic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft				
Gu----------------- Guyton	D	Rare---------	---	---	0-1.5	Perched	Dec-May	High-----	Moderate.
GY:									
Guyton------------	D	Frequent----	Very brief to long.	Jan-Dec	0-1.5	Perched	Dec-May	High-----	Moderate.
Ouachita----------	C	Frequent----	Very brief to long.	Dec-May	>6.0	---	---	Moderate	Moderate.
Hw----------------- Hollywood	D	None---------	---	---	>6.0	---	---	High-----	Low.
Ke----------------- Keithville	C	None---------	---	---	2.0-3.0	Perched	Dec-Apr	High-----	Moderate.
Ks:									
Kisatchie---------	D	None---------	---	---	>6.0	---	---	High-----	High.
Oula--------------	D	None---------	---	---	>6.0	---	---	High-----	High.
Ku----------------- Kurth	C	None---------	---	---	2.5-3.5	Perched	Jan-Apr	High-----	Moderate.
Le----------------- Lexington	B	None---------	---	---	>6.0	---	---	Moderate	Moderate.
Lf----------------- Libuse	C	None---------	---	---	1.5-3.0	Perched	Jan-Apr	High-----	Moderate.
Mb----------------- Malbis	B	None---------	---	---	2.5-4.0	Perched	Dec-Mar	Moderate	Moderate.
OE:									
Ouachita----------	C	Frequent----	Very brief to very long.	Dec-May	>6.0	---	---	Moderate	Moderate.
Jena--------------	B	Frequent----	Very brief to very long.	Dec-Apr	>6.0	---	---	Moderate	High.
Ou----------------- Oula	D	None---------	---	---	>6.0	---	---	High-----	High.
Pb----------------- Pheba	C	None---------	---	---	1.5-2.0	Perched	Jan-Mar	High-----	High.
Pg. Pits									
Pr, Pv------------- Providence	C	None---------	---	---	1.5-3.0	Perched	Jan-Mar	Moderate	Moderate.
Rs, Rt------------- Ruston	B	None---------	---	---	>6.0	---	---	Moderate	Moderate.
Sa, Sb------------- Sacul	C	None---------	---	---	2.0-4.0	Apparent	Dec-Apr	High-----	Moderate.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table			Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Uncoated steel	Concrete
					Ft				
Sf---------------- Savannah	C	None---------	---	---	1.5-3.0	Perched	Jan-Mar	Moderate	High.
Sh---------------- Sharkey	D	Frequent----	Brief to very long.	Dec-Jul	0-2.0	Apparent	Dec-Apr	High-----	Low.
Sk---------------- Shatta	C	None---------	---	---	1.5-3.0	Perched	Dec-Jun	Moderate	Moderate.
Sm---------------- Smithdale	B	None---------	---	---	>6.0	---	---	Low------	Moderate.
Te---------------- Tensas	D	Occasional	Brief to long.	Dec-Jul	1.0-3.0	Apparent	Dec-Apr	High-----	Moderate.
Tp---------------- Tippah	C	None---------	---	---	2.0-2.5	Perched	Dec-Apr	High-----	High.
Un---------------- Una	D	Frequent----	Long to very long.	Jan-Mar	0.5-1.0	Apparent	Nov-Apr	High-----	High.
Vk---------------- Vick	C	None---------	---	---	0.5-2.0	Perched	Dec-Apr	High-----	Moderate.
Ze---------------- Zenoria	C	Occasional	Brief to very long.	Dec-Jun	1.5-2.5	Apparent	Dec-Apr	High-----	High.

TABLE 17.--FERTILITY TEST DATA FOR SELECTED SOILS

(Analyses by the Soil Fertility Laboratory, Louisiana Agricultural Experiment Station. The symbol < means less than. Dashes indicate that analyses were not made)

Soil name and sample number	Depth	Horizon	pH 1:1 H_2O	Organic carbon	Extractable phosphorus	Exchangeable cations: Ca	Mg	K	Na	Al	H	Total acidity	Cation-exchange capacity (effective)	Cation-exchange capacity (sum)	Base saturation (sum)	Saturation: Effective cation-exchange capacity Al	Saturation: Sum of cation-exchange capacity Na
	In			Pct	Ppm	Milliequivalents/100 grams of soil									Pct	Pct	Pct
Alligator clay:[1] (S84LA59-1)	0-5	Ap	4.8	2.31	54	20.2	7.8	0.5	0.4	1.3	0.5	16.2	30.7	45.1	64.1	4.2	0.9
	5-14	Bg1	4.9	1.56	5	23.1	9.2	0.5	1.1	1.0	0.4	13.3	35.3	47.2	71.8	2.8	2.4
	14-33	Bg2	5.3	1.43	18	24.2	10.9	0.5	2.0	0.0	0.3	12.1	37.9	49.7	75.6	0.0	4.0
	33-60	Bg3	4.8	1.52	5	22.9	13.3	0.5	2.9	0.4	0.3	13.9	40.4	53.6	74.1	1.0	5.4
Bayoudan clay:[1] (S84LA59-9)	0-3	A	4.6	4.43	5	11.4	8.1	0.6	0.1	4.1	0.1	16.7	24.4	37.0	54.8	16.8	0.3
	3-12	Bw1	4.4	0.81	5	9.2	7.2	0.7	0.2	12.8	0.0	19.4	30.1	36.7	47.1	42.6	0.5
	12-22	Bw2	3.9	0.37	5	8.5	7.7	0.9	0.3	16.7	0.0	22.0	34.1	39.4	44.2	49.0	0.8
	22-34	By1	3.6	0.10	5	6.9	7.1	0.8	0.3	16.1	0.0	22.0	31.2	37.2	40.8	51.5	0.9
	34-68	By2	3.8	0.06	5	6.9	6.8	0.7	0.5	13.3	0.0	18.4	28.2	33.3	44.8	47.1	1.4
Bayoudan silt loam:[2] (S85LA59-15)	0-3	A	4.2	2.22	5	3.4	2.8	0.3	0.1	5.9	0.5	15.6	13.0	22.2	29.7	45.4	0.5
	3-9	Bw1	4.8	0.59	5	4.5	4.4	0.3	0.2	10.0	0.2	18.0	19.6	27.4	34.3	51.0	0.7
	9-14	Bw2	4.6	0.24	5	6.1	7.0	0.5	0.5	16.2	0.4	26.2	30.7	40.3	35.0	52.8	1.2
	14-23	Bw3	5.1	0.24	5	6.6	7.8	0.6	0.7	16.7	0.0	26.8	32.4	42.5	36.9	51.5	1.6
	23-34	Bw4	4.7	0.15	5	6.6	8.3	0.5	1.1	14.6	0.3	25.2	31.4	41.7	39.6	46.5	2.6
	34-57	By	4.3	0.10	5	7.0	8.6	0.5	1.7	12.2	0.4	21.2	30.4	39.0	45.6	40.1	4.4
	57-75	BC	4.0	0.01	5	10.0	12.4	0.6	3.5	7.8	0.5	18.4	34.8	44.9	59.0	22.4	7.8
Bienville loamy fine sand:[1] (S85LA59-17)	0-9	Ap	5.2	0.85	18	0.8	0.1	0.1	0.0	0.4	0.2	3.2	1.6	4.2	23.8	25.0	0.0
	9-17	E	5.5	0.06	5	1.0	0.2	0.1	0.0	0.2	0.0	0.8	1.5	2.1	61.9	13.3	0.0
	17-37	B/E	5.4	0.01	5	1.2	0.2	0.1	0.0	0.5	0.1	1.4	2.1	2.9	51.7	23.8	0.0
	37-46	Bt1	5.1	0.00	5	0.9	0.3	0.0	0.0	1.2	0.1	2.0	2.5	3.2	37.5	48.0	0.0
	46-64	Bt2	5.1	0.00	6	0.6	0.2	0.0	0.0	0.8	0.2	1.2	1.8	2.0	40.0	44.4	0.0
Bursley silt loam:[1] (S84LA59-10)	0-3	A	4.3	4.61	12	4.3	2.7	0.3	0.2	4.6	0.0	13.7	12.1	21.2	35.4	38.0	0.8
	3-6	E	4.5	0.81	5	4.4	2.1	0.1	0.1	1.5	0.8	5.8	9.0	12.5	53.6	16.7	0.6
	6-11	BE	5.0	0.46	5	8.5	3.3	0.2	0.1	0.5	0.1	4.5	12.7	16.6	72.9	3.9	0.8
	11-16	Bt/E1	5.1	0.24	5	12.5	4.6	0.2	0.3	0.3	0.3	5.4	18.2	23.1	76.6	1.6	1.3
	16-34	Bt/E2	5.4	0.19	5	12.7	4.8	0.3	0.4	0.2	0.2	6.3	18.6	24.4	74.2	1.1	1.5
	34-46	Bt	5.4	0.06	5	11.1	4.3	0.2	0.5	0.0	0.2	5.4	16.3	21.5	74.9	0.0	2.1
	46-54	2Btb	5.5	0.02	5	10.2	4.0	0.2	0.5	0.0	0.2	4.5	15.1	19.4	76.7	0.0	2.5
	54-65	2BCb	5.5	0.01	17	6.3	2.6	0.2	0.4	0.0	0.0	3.6	9.5	13.0	72.3	0.0	3.1

See footnotes at end of table.

TABLE 17.--FERTILITY TEST DATA FOR SELECTED SOILS--Continued

Soil name and sample number	Depth	Hori- zon	pH 1:1 H_2O	Or- ganic car- bon	Extract- able phos- phorus	Exchangeable cations: Ca	Mg	K	Na	Al	H	Total acid- ity	Cation- exchange capacity (effective)	Cation- exchange capacity (sum)	Base satura- tion (sum)	Saturation: Effective cation- exchange capacity Al	Sum of cation- exchange capacity Na
	In			Pct	Ppm	----------Milliequivalents/100 grams of soil----------									Pct	Pct	Pct
Cahaba fine sandy loam:[1] (S85LA59-16)	0-8	Ap	5.5	0.59	27	1.2	0.4	0.1	0.0	0.2	0.2	3.2	2.1	4.9	34.7	9.5	0.0
	8-14	E	5.3	0.19	9	1.2	0.2	0.1	0.0	0.5	0.1	2.2	2.1	3.7	40.5	23.8	0.0
	14-18	B/E	5.2	0.24	11	1.9	0.5	0.1	0.0	1.5	0.1	4.4	4.1	6.9	36.2	36.6	0.0
	18-29	Bt1	5.0	0.24	12	1.6	0.9	0.2	0.0	4.8	0.2	9.6	7.7	12.3	22.0	62.3	0.0
	29-36	Bt2	5.0	0.10	5	0.6	0.8	0.1	0.0	4.4	0.4	7.6	6.3	9.1	16.5	69.8	0.0
	36-46	BC	5.0	0.00	6	0.3	0.4	0.1	0.0	2.6	0.2	4.0	3.6	4.8	16.7	72.2	0.0
	46-56	C1	5.1	0.00	5	0.3	0.2	0.0	0.0	1.0	0.2	1.6	1.7	2.1	23.8	58.8	0.0
	56-75	C2	5.0	0.00	10	0.3	0.5	0.1	0.0	2.2	0.2	3.4	3.3	4.3	20.9	66.7	0.0
Deerford silt loam:[1] (S84LA59-8)	0-3	A	4.2	5.00	9	5.8	3.4	0.3	0.2	5.4	0.8	17.1	15.9	26.9	36.4	33.8	0.7
	3-9	E	4.5	1.12	5	6.3	3.0	0.2	0.3	2.3	0.4	7.9	12.5	17.6	55.2	18.5	1.5
	9-21	B/E	5.0	0.41	5	13.4	6.7	0.3	0.9	0.8	2.2	6.5	24.3	27.8	76.6	3.3	3.2
	21-43	Btn/E	4.9	0.06	5	8.1	5.8	0.3	2.7	0.3	0.3	5.9	17.5	22.8	74.1	1.7	11.9
	43-51	Btnb1	5.8	0.02	9	12.0	6.4	0.2	3.4	0.0	0.0	4.7	22.0	26.7	82.4	0.0	12.6
	51-65	Btnb2	6.4	0.01	11	11.2	5.4	0.2	3.1	0.0	0.0	2.3	19.9	22.2	89.6	0.0	14.0
Deerford silt loam:[3] (S83LA59-1)	0-4	A	4.7	2.90	5	2.3	1.8	0.2	0.4	1.5	0.8	15.8	7.0	20.5	22.9	21.4	2.0
	4-12	E/B	5.1	0.40	<5	1.9	2.6	0.1	0.5	2.0	0.7	9.2	7.8	14.3	35.7	25.6	3.5
	12-22	B/E	5.0	0.25	<5	3.6	5.1	0.1	1.5	0.6	0.5	8.8	11.4	19.1	53.9	5.8	7.8
	22-35	Btn	6.8	0.13	<5	7.2	7.4	0.2	5.3	0.0	0.0	4.7	20.1	24.8	81.0	---	21.4
	35-42	2Btnb1	7.3	0.09	<5	17.0	9.4	0.2	7.5	---	---	4.1	34.1	38.2	89.3	---	19.6
	42-58	2Btnb2	7.7	0.10	<5	8.7	12.0	0.3	10.4	---	---	5.0	31.4	36.4	86.3	---	28.6
	58-65	2Btnb3	7.8	0.06	30	4.9	8.6	0.2	6.5	---	---	4.0	20.2	24.2	83.5	---	26.9
Dundee loam:[1] (S85LA59-18)	0-6	Ap	5.3	1.38	122	9.7	2.8	0.4	0.1	0.4	0.2	9.2	13.6	22.2	58.6	2.9	0.5
	6-14	Btg1	5.7	0.28	108	14.9	4.8	0.5	0.2	0.2	0.2	7.8	20.8	28.2	72.3	1.0	0.7
	14-23	Btg2	6.0	0.19	152	14.0	5.4	0.5	0.2	0.0	0.0	6.8	20.1	26.9	74.7	0.0	0.7
	23-33	Btg3	6.0	0.15	146	12.0	4.7	0.4	0.3	0.0	0.0	5.6	17.4	23.0	75.7	0.0	1.3
	33-43	2Cg1	6.6	0.10	143	9.5	4.1	0.3	0.3	0.0	0.0	4.3	14.2	18.5	76.8	0.0	1.6
	43-60	2Cg2	6.9	0.15	178	10.5	4.4	0.3	0.3	0.0	0.0	4.6	15.5	20.1	77.1	0.0	1.5
Fausse clay:[4] (S84LA59-3)	0-5	A	5.3	2.71	65	34.7	10.5	0.8	1.0	0.2	0.3	18.0	47.5	64.9	72.3	0.4	1.5
	5-10	Bg1	6.6	1.78	51	40.8	12.9	0.5	1.5	0.0	0.0	14.0	55.7	69.7	79.9	0.0	2.2
	10-23	Bg2	7.5	0.59	152	53.8	15.2	0.6	2.1	0.0	0.0	14.2	71.7	85.9	83.5	0.0	2.4
	23-39	Bg3	7.6	0.32	188	47.5	14.0	0.4	1.9	0.0	0.0	12.6	63.8	76.3	83.5	0.0	2.4
	39-60	Cg	7.3	0.32	300	44.7	12.1	0.7	1.1	0.0	0.0	13.1	58.6	71.6	81.7	0.0	1.5

See footnotes at end of table.

TABLE 17.--FERTILITY TEST DATA FOR SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	pH 1:1 H_2O	Organic carbon	Extractable phosphorus	Exchangeable cations: Ca	Mg	K	Na	Al	H	Total acidity	Cation-exchange capacity (effective)	Cation-exchange capacity (sum)	Base saturation (sum)	Saturation: Effective cation-exchange capacity Al	Saturation: Sum of cation-exchange capacity Na
	In			Pct	Ppm	---------Milliequivalents/100 grams of soil								-----------	Pct	Pct	Pct
Forestdale silty clay loam:[1] (S84LA59-7)	0-4	A	4.8	4.61	23	13.3	6.3	0.7	0.2	0.6	0.3	10.8	21.4	31.3	65.5	2.8	0.6
	4-23	Btg1	4.9	0.68	5	16.0	7.4	0.4	0.3	1.5	0.1	6.8	25.7	30.9	78.0	5.8	1.1
	23-39	Btg2	5.5	0.06	5	16.3	6.6	0.3	0.6	0.0	0.2	4.3	24.0	28.1	84.7	0.0	2.1
	39-65	BCg	5.7	0.01	7	15.3	6.4	0.3	0.7	0.0	0.0	4.5	22.7	27.2	83.4	0.0	2.4
Gore silt loam:[1] (S85LA59-24)	0-3	A	5.0	2.18	<5	2.8	1.4	0.2	0.0	1.4	0.6	8.2	6.4	12.6	34.9	21.9	0.0
	3-6	E	4.7	0.46	<5	2.3	1.7	0.1	0.1	4.3	0.3	8.2	8.8	12.4	33.9	48.9	0.8
	6-15	Bt1	4.8	0.46	<5	9.9	8.1	0.5	0.2	13.8	0.4	22.4	32.9	41.4	45.5	41.9	0.5
	15-25	Bt2	4.9	0.24	<5	9.7	9.7	0.5	0.4	13.9	0.3	21.1	34.5	41.4	49.0	40.3	1.0
	25-38	Bt3	4.6	0.10	<5	11.1	12.8	0.7	0.9	12.5	0.5	20.3	38.5	45.8	55.7	32.5	2.0
	38-45	Bt4	4.6	0.10	<5	9.4	10.8	0.5	0.8	9.8	0.2	16.2	31.5	37.7	57.0	31.1	2.1
	45-60	BC	4.7	0.01	<5	5.0	5.8	0.3	0.4	5.3	0.1	9.3	16.9	20.8	55.3	31.4	1.9
Hollywood clay:[1] (S85LA59-3)	0-7	Ap	6.0	3.73	6	48.2	3.5	0.6	0.4	0.0	0.0	16.5	52.7	69.2	76.2	0.0	0.6
	7-17	A1	6.0	1.52	5	48.6	2.5	0.4	1.3	0.0	0.0	16.5	52.8	69.3	76.2	0.0	1.9
	17-25	A2	6.9	1.03	5	49.7	2.6	0.5	2.1	0.0	0.0	11.9	54.9	66.8	82.2	0.0	3.1
	25-32	Bk1	7.9	0.28	5	60.6	2.4	0.6	2.1	0.0	0.0	6.2	65.7	71.9	91.4	0.0	2.9
	32-50	Bk2	7.4	0.28	5	63.8	3.4	0.8	3.4	0.0	0.0	7.0	71.4	78.4	91.1	0.0	4.3
	50-63	Bk3	7.5	0.19	5	56.1	3.4	0.6	2.6	0.0	0.0	4.0	62.7	66.7	94.0	0.0	3.9
Keithville very fine sandy loam:[1] (S85LA59-4)	0-3	Ap	4.9	1.07	9	2.6	0.7	0.1	0.1	0.0	0.0	4.8	3.5	8.3	42.2	0.0	1.2
	3-7	E	4.4	0.28	5	1.4	0.6	0.0	0.1	2.4	0.2	6.2	4.7	8.3	25.3	51.1	1.2
	7-12	BE	4.3	0.24	5	1.4	1.3	0.1	0.1	4.0	0.0	12.7	6.9	15.6	18.6	58.0	0.6
	12-18	Bt1	4.3	0.19	6	1.4	1.9	0.1	0.1	8.0	0.4	17.6	11.9	21.1	16.6	67.2	0.5
	18-25	Bt2	4.3	0.10	5	1.0	1.6	0.1	0.2	7.6	0.5	15.9	11.0	18.8	15.4	69.1	1.1
	25-32	Bt3	4.3	0.10	5	1.1	1.6	0.1	0.2	7.4	0.5	15.1	10.9	18.1	16.6	67.9	1.1
	32-38	B/E	4.4	0.06	5	1.5	2.0	0.1	0.3	7.8	0.5	15.1	12.2	19.0	20.5	63.9	1.6
	38-48	2Bt4	4.4	0.01	5	4.0	3.7	0.2	0.6	7.8	0.3	15.1	16.6	23.6	36.0	47.0	2.5
	48-72	2Bt5	4.7	0.01	5	6.6	5.6	0.2	0.8	4.8	0.7	12.4	18.7	25.6	51.6	25.7	3.1
Kurth fine sandy loam:[1] (S85LA59-25)	0-6	A	5.1	0.72	<5	1.8	0.5	0.1	0.0	0.7	0.2	4.9	3.3	7.3	32.9	21.2	0.0
	6-16	E	5.2	0.41	<5	1.9	0.6	0.1	0.0	0.8	0.0	4.9	3.4	7.5	34.7	23.5	0.0
	16-22	Bt1	4.8	0.46	<5	1.4	1.3	0.1	0.0	3.8	0.1	8.4	6.7	11.2	25.0	56.7	0.0
	22-27	Bt2	4.9	0.19	<5	1.6	1.7	0.1	0.1	4.6	0.1	9.3	8.2	12.8	27.3	56.1	0.8
	27-38	Bt/E1	5.1	0.06	<5	1.9	2.2	0.2	0.1	4.5	0.1	8.7	9.0	13.1	33.6	50.0	0.8
	38-48	Bt/E2	5.4	0.01	<5	3.3	3.1	0.2	0.4	3.1	0.0	7.4	10.1	14.4	48.6	30.7	2.8
	48-54	Bt/E3	5.2	0.00	<5	4.8	4.5	0.2	0.7	0.8	0.6	5.3	11.6	15.5	65.8	6.9	4.5
	54-60	2Cr	5.2	0.00	<5	3.2	2.9	0.1	0.7	0.2	0.4	3.8	7.5	10.7	64.5	2.7	6.5

See footnotes at end of table.

TABLE 17.--FERTILITY TEST DATA FOR SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	pH 1:1 H_2O	Organic carbon	Extractable phosphorus	Exchangeable cations: Ca	Mg	K	Na	Al	H	Total acidity	Cation-exchange capacity (effective)	Cation-exchange capacity (sum)	Base saturation (sum)	Saturation: Effective cation-exchange capacity Al	Saturation: Sum of cation-exchange capacity Na
	In			Pct	Ppm	Milliequivalents/100 grams of soil									Pct	Pct	Pct
Malbis fine sandy loam:[1] (S84LA59-5)	0-3	Ap	5.9	2.67	6	7.4	0.7	0.1	0.0	0.0	0.0	4.5	8.2	12.8	64.9	0.0	0.3
	3-7	E	6.0	1.12	5	5.3	0.4	0.0	0.0	0.0	0.0	2.9	7.4	8.7	66.5	0.0	0.2
	7-15	Bt1	4.7	0.32	5	2.5	0.9	0.1	0.1	2.7	0.2	5.8	6.5	9.5	38.7	41.0	1.0
	15-21	Bt2	4.5	0.24	5	2.1	1.5	0.2	0.1	5.0	0.1	9.6	9.0	13.4	28.5	56.0	0.6
	21-30	Bt3	4.7	0.19	5	1.7	1.8	0.2	0.2	4.9	0.1	13.0	8.9	16.9	22.9	55.3	1.1
	30-45	Btv1	4.7	0.02	5	1.2	1.5	0.1	0.3	5.2	0.6	10.1	8.9	13.1	23.0	58.9	2.0
	45-60	Btv2	4.9	0.01	5	1.6	1.5	0.1	0.3	3.6	0.6	7.6	6.1	11.1	31.4	46.8	3.0
	60-72	Btv3	4.8	0.01	5	4.4	3.1	0.1	0.6	2.2	0.8	5.8	11.2	14.0	58.5	19.7	4.2
Ouachita silt loam:[5] (S85LA59-21)	0-6	Ap	4.7	1.69	6	2.2	0.9	0.1	0.0	3.9	0.2	13.6	7.3	16.8	19.0	53.4	0.0
	6-20	Bw1	4.6	0.46	5	0.5	0.4	0.1	0.0	5.7	0.2	13.3	6.9	14.3	7.0	82.6	0.0
	20-30	Bw2	4.8	0.24	5	0.3	0.4	0.1	0.1	5.8	0.1	12.2	6.8	13.1	6.9	85.3	0.8
	30-52	Bg1	4.9	0.19	6	0.2	0.5	0.1	0.2	7.8	0.0	14.4	8.8	15.4	6.5	88.6	1.3
	52-70	Bg2	4.8	0.06	5	0.2	0.5	0.1	0.3	7.0	0.2	13.9	8.3	15.0	7.3	84.3	2.0
Pheba loam:[1,6] (S85LA59-14)	0-4	A	4.8	1.78	5	1.6	0.4	0.1	0.0	0.8	0.3	6.8	3.2	8.9	23.6	25.0	0.0
	4-8	E	4.7	1.25	5	0.9	0.3	0.0	0.0	1.1	0.3	6.4	2.6	7.6	15.8	42.3	0.0
	8-13	B/E	4.9	0.19	5	0.7	0.4	0.0	0.0	1.6	0.4	4.2	3.1	5.3	20.8	51.6	0.0
	13-19	E/B	5.3	0.19	5	0.6	0.4	0.0	0.2	2.0	0.1	4.6	3.3	5.8	20.7	60.6	3.4
	19-29	Btnx1	5.5	0.06	5	0.6	1.2	0.1	1.3	4.8	0.2	10.8	8.2	14.0	22.9	58.5	9.3
	29-38	Btnx2	5.3	0.06	5	0.6	1.8	0.1	2.3	4.7	0.3	10.4	9.8	15.2	31.6	48.0	15.1
	38-45	Btnx3	5.3	0.00	5	0.8	1.6	0.1	2.1	2.4	0.4	5.8	7.4	10.4	44.2	32.4	20.2
	45-56	Btnx4	5.2	0.00	5	1.0	1.7	0.1	2.6	1.5	0.1	4.6	7.0	10.0	54.0	21.4	26.0
	56-75	Btnx5	5.3	0.01	5	1.3	2.1	0.1	3.3	0.4	0.3	3.4	7.5	10.2	66.7	5.3	32.4
Savannah fine sandy loam:[1] (S85LA59-2)	0-5	A	4.5	1.34	9	1.2	0.3	0.2	0.1	0.9	0.0	7.8	2.7	9.6	18.8	33.3	1.0
	5-10	E	4.5	0.28	5	1.4	0.7	0.1	0.1	2.0	0.0	3.8	4.3	6.1	37.7	46.5	1.6
	10-13	BE	4.2	0.10	5	1.3	1.1	0.1	0.1	3.8	0.0	6.8	6.4	9.4	27.7	59.4	1.1
	13-24	Bt1	4.2	0.10	5	0.8	1.1	0.1	0.1	3.2	0.0	9.2	5.3	11.3	18.6	60.4	0.9
	24-30	Bt2	4.3	0.06	5	0.7	0.9	0.1	0.1	3.0	0.0	6.5	4.8	8.3	21.7	62.5	1.2
	30-46	Btx1	4.4	0.01	5	0.6	1.0	0.1	0.1	3.0	0.0	7.0	4.8	8.8	20.5	62.5	1.1
	46-65	Btx2	4.4	0.01	5	1.0	1.6	0.1	0.3	4.4	0.0	9.2	7.4	12.2	24.6	59.5	2.5
Sharkey clay:[1] (S84LA59-2)	0-5	A	4.7	2.93	17	25.4	9.3	0.8	0.5	2.3	0.6	9.5	38.9	45.5	79.1	5.9	1.1
	5-12	Bg1	4.8	2.14	14	30.1	11.0	0.8	0.7	1.4	0.5	13.1	44.5	55.7	76.5	3.1	1.3
	12-22	Bg2	6.5	1.69	24	39.8	14.4	0.7	1.4	0.0	0.3	18.5	56.6	74.8	75.3	0.0	1.9
	22-44	Bg3	7.5	1.52	72	36.9	13.8	0.6	1.4	0.0	0.2	20.9	73.8	75.7	72.4	0.0	1.9
	44-54	Bg4	7.4	1.65	159	33.6	10.7	0.6	1.2	0.0	0.2	8.8	55.1	54.9	84.0	0.0	2.1

See footnotes at end of table.

TABLE 17.--FERTILITY TEST DATA FOR SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	pH 1:1 H_2O	Organic carbon	Extractable phosphorus	Exchangeable cations: Ca	Mg	K	Na	Al	H	Total acidity	Cation-exchange capacity (effective)	Cation-exchange capacity (sum)	Base saturation (sum)	Saturation: Effective cation-exchange capacity Al	Sum of cation-exchange capacity Na
	In			Pct	Ppm	Milliequivalents/100 grams of soil									Pct	Pct	Pct
Shatta very fine sandy loam:[1] (S85LA59-4)	0-3	A	5.9	3.06	6	8.2	0.7	0.1	0.1	0.0	0.0	9.7	9.1	18.8	48.4	0.0	0.5
	3-7	E	5.6	0.54	5	5.3	0.7	0.0	0.1	0.0	0.0	4.6	6.1	10.7	57.0	0.0	0.9
	7-10	BE	4.8	0.37	5	3.3	1.0	0.0	0.1	1.6	0.0	6.8	6.0	11.2	39.3	26.7	0.9
	10-17	Bt1	4.5	0.15	5	1.3	1.3	0.1	0.1	3.2	0.0	8.6	6.0	11.4	24.6	53.3	0.9
	17-26	Bt2	4.5	0.06	5	0.9	1.1	0.1	0.1	4.0	0.0	9.5	6.2	11.7	18.8	64.5	0.9
	26-41	Btx1	4.9	0.01	5	1.0	1.0	0.1	0.2	4.2	0.0	9.5	6.5	11.8	19.5	64.6	1.7
	41-58	Btx2	4.9	0.01	5	2.1	2.2	0.1	0.5	2.6	0.4	7.0	7.9	11.9	41.2	32.9	4.2
	58-70	BC	4.7	0.01	5	4.1	3.9	0.1	0.9	0.8	0.3	7.0	10.1	16.0	56.2	7.9	5.6
Smithdale fine sandy loam:[1] (S84LA59-11)	0-7	A	5.2	1.56	5	1.8	0.4	0.1	0.0	0.3	0.0	4.7	2.6	7.0	33.2	11.4	0.6
	7-11	E	4.7	0.32	5	0.5	0.3	0.0	0.0	0.8	0.1	3.2	1.7	4.0	20.7	46.1	0.2
	11-21	Bt1	4.5	0.19	5	0.4	1.2	0.1	0.0	4.5	0.3	7.6	6.5	9.4	18.8	68.6	0.4
	21-34	Bt2	4.5	0.01	5	0.3	0.7	0.1	0.3	3.2	0.6	6.1	5.2	7.5	18.4	61.9	4.1
	34-63	Bt3	4.6	0.01	5	0.2	0.4	0.1	0.0	3.2	0.3	5.4	4.2	6.1	12.1	75.4	0.8
	63-85	Bt4	4.5	0.01	5	0.3	0.3	0.0	0.0	2.2	0.0	3.4	2.8	4.0	15.4	78.0	0.9
Tensas silty clay:[1] (S84LA59-4)	0-4	A	4.5	2.53	35	19.2	5.9	0.8	0.3	5.0	0.3	20.3	31.5	46.4	56.3	15.9	0.6
	4-14	Btg1	4.5	0.63	6	27.1	7.4	0.7	0.6	4.7	0.0	23.0	40.5	58.8	60.9	11.6	1.1
	14-25	Btg2	4.8	0.24	10	30.1	10.4	0.7	0.9	0.8	0.6	13.9	43.5	56.0	75.2	1.8	1.7
	25-33	Btg3	5.4	0.19	89	30.7	8.3	0.6	1.0	0.0	0.3	12.1	40.9	52.7	77.0	0.0	1.9
	33-44	Btg4	5.8	0.10	146	17.9	5.6	0.3	0.6	0.0	0.0	6.5	24.4	30.9	78.9	0.0	2.0
	44-61	2Btg5	5.9	0.10	150	17.2	6.6	0.4	0.6	0.0	0.0	6.8	24.4	31.6	78.5	0.0	2.0
	61-88	2C	7.1	0.10	202	16.4	8.1	0.3	0.5	0.0	0.0	3.6	25.3	29.0	87.6	0.0	1.8

[1] This is the typical pedon for the series in La Salle Parish. For a description of the soil, see the section "Detailed Soil Map Units."

[2] This is the typical pedon for map unit Bayoudan silt loam, 1 to 5 percent slopes. It is about 1.5 miles west of Little Creek, NE1/4SE1/4 sec. 36, T. 9 N., R. 1 E.

[3] This pedon is about 13 miles south of Jena, 8 miles southwest of junction of Louisiana Highway 28 and U.S. Highway 84, 0.25 mile north of Diversion Canal levee, 63 feet into woods from ditchbank; NE1/4NW1/4 sec. 30, T. 6 N., R. 4 E.

[4] This pedon is an included soil in an area of Fausse clay, frequently flooded. It has a surface layer that is slightly more acid than is typical for the Fausse series. It is in the SE1/4SW1/4 sec. 26, T. 7 N., R. 4 E.

[5] This pedon is an included soil in an area of Ouachita and Jena soils, frequently flooded. It has gleyed layers in the lower part of the subsoil that are not typical for the series. It is about 1.25 miles west of Searcy, 2 miles west on Louisiana Highway 500 from junction with U.S. Highway 84, 0.7 mile south on pipeline, 35 feet west of center of pipeline right-of-way; SW1/4SW1/4 sec. 2, T. 8 N., R. 2 E.

[6] This pedon has a higher content of sodium in the Btnx horizon than is typical for the Pheba series.

TABLE 18.--PHYSICAL TEST DATA FOR SELECTED SOILS

(Dashes indicate that analyses were not made)

Soil name and sample number	Horizon	Depth	Particle-size distribution: Sand: Very coarse (2-1 mm)	Sand: Coarse (1-0.5 mm)	Sand: Medium (0.5-0.25 mm)	Sand: Fine (0.25-0.1 mm)	Sand: Very fine (0.1-0.05 mm)	Sand: Total (2.0-0.5 mm)	Silt (0.25-0.002 mm)	Clay (0.002 mm)	Fine clay (0.0002 mm)	Water content: 1/3 bar	Water content: 15 bar	Water content: Water retention	Bulk density: 1/3 bar	Bulk density: Air-dry	Bulk density: Oven-dry	Bulk density: Field moisture	COLE
		In	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct (wt)	Pct (wt)	Pct (wt)	g/cm^3	g/cm^3	g/cm^3	g/cm^3	
Bayoudan silt loam:[1,3] (S84LA59-15)	Ap	0-4	0.0	1.8	3.1	5.0	15.5	25.4	56.1	18.5	---	27.5	12.4	15.1	---	1.47	1.50	1.35	---
	Bw1	4-7	0.0	0.8	1.5	3.0	17.0	22.3	48.7	29.0	---	29.4	16.3	13.1	---	1.65	1.66	1.44	---
	Bw2	7-11	0.0	0.5	0.7	1.5	11.4	14.1	36.6	49.3	---	36.2	24.0	12.2	---	1.81	1.83	1.26	---
	By1	11-24	0.0	0.3	0.4	0.8	5.4	6.9	29.6	63.5	---	44.7	30.5	14.2	---	1.87	1.95	1.21	---
	By2	24-37	0.0	0.2	0.3	0.6	3.4	4.5	27.9	67.6	---	46.5	33.1	13.4	---	1.91	1.97	1.26	---
	By3	37-50	0.0	0.1	0.2	0.4	1.5	2.2	23.3	74.5	---	61.5	35.6	25.9	---	1.87	1.92	1.37	---
	By4	50-68	0.0	0.1	0.4	0.5	0.5	1.5	20.6	77.9	---	66.9	34.3	32.6	---	1.87	1.96	1.43	---
	By5	68-85	0.0	0.0	0.0	0.2	1.1	1.3	23.3	75.4	---	66.4	35.9	30.5	---	1.87	1.96	1.31	---
Falkner silt loam:[1,4] (S84LA59-13)	Ap	0-4	0.0	1.3	2.2	2.7	5.8	12.0	74.7	13.3	---	34.8	13.2	21.6	---	1.35	1.37	1.18	---
	Bt1	4-12	0.0	1.2	1.3	1.6	4.0	8.1	68.3	23.6	---	32.8	14.8	18.0	---	1.55	1.56	1.35	---
	Bt2	12-17	0.0	1.0	0.9	1.5	3.5	6.9	66.9	26.2	---	33.1	14.7	18.4	---	1.52	1.53	1.47	---
	Bt3	17-22	0.0	1.0	0.8	1.1	3.3	6.2	67.7	26.1	---	39.0	13.3	25.7	---	1.62	1.63	1.57	---
	2Bt4	22-29	0.0	0.5	0.5	0.8	1.9	3.7	51.8	44.5	---	38.1	21.7	16.4	---	1.90	1.93	1.43	---
	2Bt5	29-38	0.0	0.4	0.5	0.8	2.3	4.0	59.1	36.9	---	32.8	18.2	14.6	---	1.92	1.95	1.60	---
	2Bt6	38-51	0.0	0.5	0.5	1.2	4.0	6.2	62.5	31.3	---	27.5	16.5	11.0	---	1.94	1.95	1.76	---
	2Bt7	51-70	0.0	0.5	0.7	1.5	4.2	6.9	60.6	32.5	---	28.5	16.6	11.9	---	1.94	1.96	1.78	---
Frizzell silt loam:[2,4] (S85LA59-21)	A	0-3	0.1	0.3	0.6	7.4	10.4	18.8	72.1	9.1	6.2	27.4	5.6	0.28	1.30	---	1.35	---	0.013
	E	3-7	0.5	0.3	0.5	7.2	10.0	18.5	70.7	10.8	7.8	22.5	5.6	0.25	1.46	---	1.49	---	0.007
	Bt	7-18	0.3	0.2	0.4	6.2	8.7	15.8	69.5	14.7	10.7	20.7	7.0	0.20	1.49	---	1.53	---	0.009
	B/E	18-29	0.2	0.2	0.4	5.6	8.0	14.4	69.0	16.6	11.4	22.7	7.6	0.23	1.51	---	1.56	---	0.011
	B't1	29-39	0.4	0.2	0.3	4.8	6.8	12.5	61.6	25.9	20.0	26.6	12.3	0.20	1.43	---	1.63	---	0.045
	B't2	39-52	0.2	0.3	0.4	6.0	8.3	15.2	62.9	21.9	16.4	21.0	10.4	0.17	1.60	---	1.73	---	0.026
	B't3	52-64	---	0.2	0.4	6.8	10.6	18.0	64.5	17.5	13.3	19.6	8.9	0.18	1.65	---	1.72	---	0.014
Libuse silt loam:[1,4] (S85LA59-8)	A	0-6	0.7	2.0	2.4	4.6	8.0	17.7	74.9	7.4	---	34.5	5.7	28.8	---	1.38	1.39	1.34	---
	E	6-12	0.2	0.9	1.5	2.8	6.0	11.4	71.8	16.8	---	32.9	7.6	25.3	---	1.50	1.50	1.48	---
	Bt1	12-22	0.1	0.5	0.8	2.5	5.4	9.3	62.8	27.9	---	36.7	12.8	23.9	---	1.62	1.63	1.56	---
	B/E	22-27	0.3	0.5	0.9	3.2	7.6	12.5	63.1	24.4	---	36.1	10.9	25.2	---	1.62	1.64	1.59	---
	Btx1	27-38	0.4	0.5	1.1	3.6	9.6	15.2	58.6	26.2	---	36.4	13.4	23.0	---	1.78	1.79	1.74	---
	Btx2	38-52	0.3	0.3	1.1	4.1	10.6	16.4	63.7	19.9	---	31.7	12.2	19.5	---	1.77	1.77	1.73	---
	Btx2	52-62	0.2	0.4	1.1	4.3	10.7	16.7	62.8	20.5	---	31.3	12.9	18.4	---	1.75	1.77	1.71	---
	Btx3	62-73	0.2	0.2	0.8	3.6	9.7	14.5	61.5	24.0	---	32.8	14.0	18.8	---	1.75	1.75	1.72	---
	Btx4	73-83	0.0	0.5	1.1	4.1	12.5	18.2	70.2	11.6	---	33.1	15.1	18.0	---	1.77	1.78	1.72	---

See footnotes at end of table.

TABLE 18.--PHYSICAL TEST DATA FOR SELECTED SOILS--Continued

Soil name and sample number	Horizon	Depth	Particle-size distribution: Sand: Very coarse (2-1 mm)	Sand: Coarse (1-0.5 mm)	Sand: Medium (0.5-0.25 mm)	Sand: Fine (0.25-0.1 mm)	Sand: Very fine (0.1-0.05 mm)	Sand: Total (2.0-0.5 mm)	Silt (0.25-0.002 mm)	Clay (0.002 mm)	Fine clay (0.0002 mm)	Water content: 1/3 bar	Water content: 15 bar	Water content: Water retention	Bulk density: 1/3 bar	Bulk density: Air-dry	Bulk density: Oven-dry	Bulk density: Field moisture	COLE
		In	Pct									Pct (wt)			g/cm^3	g/cm^3	g/cm^3	g/cm^3	
Oula very fine sandy loam:[1,4]	Ap	0-7	1.6	1.4	6.1	16.1	10.4	35.6	48.1	16.3	---	32.3	7.8	24.5	---	1.47	1.49	1.44	---
(S85LA59-10)	Bt1	7-15	0.2	0.4	3.5	8.4	4.6	17.1	32.4	50.5	---	47.8	20.4	27.4	---	1.79	1.87	1.46	---
	Bt2	15-24	0.5	0.4	1.7	4.0	2.5	9.1	29.8	61.1	---	60.2	24.2	36.0	---	1.75	1.86	1.34	---
	Bt3	24-40	0.0	0.2	1.9	4.8	3.5	10.4	32.9	56.7	---	57.4	22.3	34.1	---	1.79	1.89	1.37	---
	Bt4	40-58	0.0	0.3	3.5	8.0	5.1	17.1	35.1	47.8	---	49.8	19.1	30.7	---	1.89	1.95	1.52	---
	C	58-72	0.0	0.1	7.0	22.0	11.4	40.5	22.7	36.8	---	37.2	13.1	24.1	---	1.91	1.93	1.78	---
Providence silt loam:[2,4]	Ap1	0-4	0.2	2.0	6.1	1.6	0.7	10.6	79.3	10.1	4.1	29.0	5.8	0.31	1.33	---	1.36	---	0.007
(S84LA59-22)	Ap2	4-8	---	1.2	5.2	1.2	0.5	8.1	76.2	15.7	7.9	23.4	6.7	0.25	1.52	---	1.56	---	0.009
	Bt1	8-18	---	0.7	2.6	0.7	0.3	4.3	65.9	29.8	17.6	24.1	13.2	0.16	1.46	---	1.58	---	0.027
	Bt2	18-25	---	1.0	3.5	1.1	0.6	6.2	69.3	24.5	12.3	26.1	11.5	0.21	1.43	---	1.49	---	0.014
	Bt3	25-31	---	1.7	4.8	1.4	0.6	8.5	67.7	23.8	12.8	26.2	11.9	0.21	1.45	---	1.62	---	---
	Btx1	31-39	---	2.2	8.3	1.4	0.6	12.5	61.2	26.3	15.9	26.6	11.8	0.22	1.48	---	1.67	---	0.041
	Btx2	39-47	---	4.6	16.8	2.5	1.0	24.9	54.2	20.9	13.2	21.4	9.9	0.18	1.59	---	1.70	---	0.023
	2Btx3	47-61	---	5.6	25.0	3.0	1.1	34.7	45.4	19.9	11.6	17.1	9.7	0.13	1.73	---	1.82	---	0.017
	2Btx4	61-71	---	8.6	32.3	4.1	1.4	46.4	37.4	16.2	9.6	14.2	7.6	0.12	1.81	---	1.93	---	0.022
	2Btx5	71-82	---	9.7	43.7	5.9	2.0	61.3	28.1	10.6	6.3	---	4.4	---	1.80	---	---	---	---
Providence silt loam:[2,5]	Ap	0-3	0.4	0.5	1.0	4.8	8.4	15.1	74.1	10.8	6.3	25.2	6.4	0.23	1.24	---	1.30	---	0.016
(S84LA59-20)	BE	3-10	0.8	0.4	0.8	3.8	6.7	12.5	72.1	15.4	9.4	19.8	7.3	0.18	1.40	---	1.44	---	0.009
	Bt1	10-19	0.1	0.4	0.7	2.8	4.5	8.5	67.7	23.8	15.8	21.7	11.1	0.15	1.45	---	1.55	---	0.022
	Bt2	19-29	0.3	0.5	0.7	3.2	5.7	10.4	67.8	21.8	14.7	22.5	10.3	0.18	1.50	---	1.57	---	0.015
	Bt3	29-35	0.9	0.5	0.7	4.3	7.5	13.9	64.2	21.9	16.1	22.5	10.1	0.19	1.50	---	1.60	---	0.022
	Btx1	35-40	0.6	0.4	0.7	4.8	8.5	15.0	65.2	19.8	15.2	19.5	9.2	0.16	1.55	---	1.64	---	0.019
	Btx2	40-55	0.5	0.3	0.6	4.3	8.3	14.0	62.0	24.0	19.1	20.2	10.8	0.15	1.62	---	1.75	---	0.026
	Btx2	55-66	0.4	0.4	0.6	4.2	8.4	14.0	62.1	23.9	18.4	22.5	10.8	0.19	1.59	---	1.74	---	0.031
	Bt4	66-80	0.4	0.3	0.7	4.4	8.4	14.2	59.3	26.5	20.7	24.0	12.5	0.18	1.55	---	1.76	---	0.043
Tippah silt loam:[2,4]	Ap	0-5	0.3	0.5	0.6	2.2	6.2	9.8	81.3	8.9	5.4	28.4	5.3	0.29	1.24	---	1.29	---	0.013
(S84LA59-23)	Bt1	5-12	0.3	0.4	0.5	1.4	3.8	6.4	70.8	22.8	16.6	24.2	10.6	0.19	1.38	---	1.44	---	0.014
	Bt2	12-18	0.1	0.4	0.5	1.3	3.6	5.9	69.5	24.6	17.7	22.6	11.7	0.16	1.49	---	1.57	---	0.018
	Bt3	18-24	0.3	0.3	0.3	1.0	3.3	5.2	69.3	25.5	18.5	23.7	12.2	0.17	1.46	---	1.55	---	0.020
	2Bt4	24-31	0.2	0.2	0.2	0.6	2.9	4.1	51.2	44.7	37.5	30.4	22.2	0.11	1.38	---	1.84	---	0.101
	2Bt5	31-41	0.2	0.1	0.1	0.5	3.9	4.8	54.7	40.5	33.1	28.0	19.4	0.12	1.44	---	1.90	---	0.097
	2Bt6	41-49	0.1	---	0.1	0.5	4.1	4.8	46.9	48.3	36.5	33.9	21.6	0.17	1.36	---	2.02	---	0.141
	2Bt7	49-58	---	---	---	0.3	4.5	4.8	42.5	52.7	37.5	32.8	24.0	0.12	1.35	---	2.00	---	0.140
	2Bt8	58-63	---	---	---	0.1	2.7	2.8	41.8	55.4	34.0	38.1	25.6	0.16	1.26	---	1.88	---	0.143
	2BC	63-67	0.1	0.2	0.2	0.4	17.5	18.4	48.4	33.2	15.4	---	17.8	---	1.30	---	---	---	---
	2BC	67-70	0.3	0.1	0.1	0.2	2.2	2.9	42.9	54.2	29.0	44.8	26.9	0.21	1.16	---	1.84	---	0.165

See footnotes at end of table.

TABLE 18.--PHYSICAL TEST DATA FOR SELECTED SOILS--Continued

Soil name and sample number	Horizon	Depth	Particle-size distribution: Sand: Very coarse (2-1 mm)	Coarse (1-0.5 mm)	Medium (0.5-0.25 mm)	Fine (0.25-0.1 mm)	Very fine (0.1-0.05 mm)	Total (2.0-0.5 mm)	Silt (0.25-0.002 mm)	Clay (0.002 mm)	Fine clay (0.0002 mm)	Water content: 1/3 bar	15 bar	Water retention	Bulk density: 1/3 bar	Air-dry	Oven-dry	Field moisture	COLE
		In	Pct									Pct (wt)			g/cm^3	g/cm^3	g/cm^3	g/cm^3	
Zenoria clay loam:[1,4] (S85LA59-9)	A1	0-2	0.3	1.6	5.5	17.1	4.2	28.7	26.0	45.3	---	37.3	15.9	21.4	---	1.62	1.65	1.43	---
	A2	2-10	0.0	0.3	2.3	11.6	4.4	18.6	25.7	55.7	---	42.1	24.8	17.3	---	1.47	1.75	1.21	---
	2B/Eb	10-19	0.0	0.3	5.9	32.7	10.4	49.3	28.9	21.8	---	27.0	10.6	16.4	---	1.71	1.71	1.64	---
	2Btgb1	19-33	0.1	0.6	5.9	32.2	11.1	49.9	25.8	24.3	---	30.8	11.6	19.2	---	1.75	1.76	1.67	---
	2Btgb2	33-52	0.2	0.6	4.0	26.3	14.0	45.1	33.6	21.3	---	30.7	11.3	19.4	---	1.69	1.70	1.61	---
	2BCb	52-67	0.1	0.2	0.7	27.0	24.6	52.6	29.0	18.4	---	31.4	9.9	21.5	---	1.64	1.70	1.59	---
	3C1	67-75	0.0	0.0	0.5	58.1	24.4	83.0	12.9	4.1	---	11.0	2.7	8.3	---	---	---	---	---
	3C2	75-80	0.0	0.0	1.7	77.8	12.8	92.3	3.5	4.2	---	9.8	1.7	8.1	---	---	---	---	---
Series not designated:[1,6] (S84LA59-13)	A	0-4	0.0	0.0	3.3	6.0	6.6	15.9	70.4	13.7	---	39.8	15.1	24.7	---	1.34	1.35	1.19	---
	E/B	4-12	0.0	0.0	0.3	2.5	2.2	5.0	69.8	25.2	---	35.1	16.1	19.0	---	1.62	1.63	1.41	---
	B/E	12-22	0.0	0.5	1.1	2.4	1.5	5.5	64.3	30.2	---	36.6	19.9	16.7	---	1.75	1.76	1.45	---
	Btn	22-35	0.0	0.4	1.0	3.1	1.4	5.9	54.6	39.5	---	42.6	22.6	20.0	---	1.87	1.91	1.51	---
	2Btnb1	35-42	0.0	0.6	1.5	4.9	2.3	9.3	50.9	39.8	---	36.8	20.1	16.7	---	1.94	1.97	1.66	---
	2Btnb2	42-58	0.0	0.2	0.8	2.7	1.6	5.3	49.7	45.0	---	39.5	23.4	16.1	---	1.97	2.00	1.54	---
	2Btnb3	58-65	0.0	0.5	1.3	6.3	9.5	17.6	52.2	30.2	---	37.9	19.1	18.8	---	1.87	1.88	1.63	---
	2BC	65-75	0.0	0.0	5.2	66.7	10.2	82.1	7.7	10.2	---	19.5	7.3	12.2	---	1.68	1.69	1.60	---
Series not designated:[1,7] (S85LA59-11)	A	0-7	0.7	4.1	37.4	22.5	2.0	66.7	29.3	4.0	---	11.0	3.8	7.2	---	1.69	1.69	1.67	---
	E	7-13	0.3	3.7	37.5	22.7	1.9	66.1	29.8	3.7	---	9.9	4.3	5.6	---	1.78	1.78	1.77	---
	Bt1	13-26	0.0	2.5	32.1	22.8	1.7	59.1	15.0	2.5	---	16.6	12.0	4.6	---	1.87	1.90	1.80	---
	Bt2	26-42	0.0	1.5	42.4	26.9	1.4	72.2	7.1	1.5	---	12.8	10.0	2.8	---	1.89	1.91	1.85	---
	B/E	42-56	0.0	1.5	63.8	14.5	1.2	81.0	4.9	1.5	---	9.8	7.5	2.3	---	1.82	1.85	1.77	---
	B't	56-75	0.0	1.3	59.8	16.0	1.3	78.4	4.9	1.3	---	10.7	8.9	1.8	---	1.79	1.85	1.71	---

See footnotes at end of table.

TABLE 18.--PHYSICAL TEST DATA FOR SELECTED SOILS--Continued

Soil name and sample number	Horizon	Depth	Particle-size distribution: Sand: Very coarse (2-1 mm)	Coarse (1-0.5 mm)	Medium (0.5-0.25 mm)	Fine (0.25-0.1 mm)	Very fine (0.1-0.05 mm)	Total (2.0-0.5 mm)	Silt (0.25-0.002 mm)	Clay (0.002 mm)	Fine clay (0.0002 mm)	Water content: 1/3 bar	15 bar	Water retention	Bulk density: 1/3 bar	Air-dry	Oven-dry	Field moisture	COLE
		In	Pct									Pct (wt)			g/cm^3	g/cm^3	g/cm^3	g/cm^3	
Series not designated:[1,8]	A	0-3	0.6	2.0	2.0	2.1	4.1	10.8	79.4	9.8	---	33.7	6.2	27.5	---	1.40	1.42	1.40	---
(S85LA59-7)	E/B	3-14	0.5	1.4	1.6	1.7	2.8	8.0	77.0	15.0	---	33.3	7.1	26.2	---	1.46	1.48	1.45	---
	B/E	14-23	0.6	1.1	1.5	1.1	2.0	6.3	72.5	21.2	---	35.9	8.9	27.0	---	1.50	1.53	1.48	---
	2Bt1	23-35	0.1	0.5	0.7	0.9	1.5	3.7	57.7	38.6	---	42.4	16.2	28.2	---	1.69	1.75	1.60	---
	2Bt2	35-44	0.4	0.5	0.6	0.9	1.8	4.2	53.4	42.4	---	36.7	14.3	22.4	---	1.73	1.77	1.63	---
	3Bt3	44-56	0.2	0.4	0.7	1.0	3.2	5.5	66.5	28.0	---	33.1	12.8	20.3	---	1.79	1.81	1.71	---
	3Bt4	56-65	0.1	0.3	0.6	1.0	2.4	4.4	78.1	17.5	---	34.8	13.7	21.1	---	1.82	1.83	1.74	---
	3Bt5	65-81	0.1	0.2	0.4	0.9	2.0	3.6	63.8	32.6	---	36.8	14.9	18.9	---	1.82	1.84	1.74	---
	3Bt6	81-91	0.1	0.1	0.3	0.6	1.8	2.9	60.3	36.8	---	38.5	13.8	24.7	---	1.94	1.97	1.77	---

[1] Analyses by the Soil Characterization Laboratory, Louisiana Agricultural Experiment Station.

[2] Analyses by the Soil Survey Investigations Staff, Soil Conservation Service, Lincoln, Nebraska.

[3] This pedon is an included soil in an area of Bayoudan silty clay loam, 5 to 15 percent slopes. It is about 2 miles southeast of Zenoria, 2.6 miles east on Louisiana Highway 500 from the Little River bridge, 0.15 mile north on gravel road, 100 feet east of road; SE1/4NW1/4 sec. 30, T. 9 N., R. 2 E.

[4] This is the typical pedon for the series in La Salle Parish. For the description and location of the soil, see the section "Soil Series and Their Morphology."

[5] This pedon is in an area of Providence silt loam, 1 to 3 percent slopes. It is not the typical pedon for the map unit. It is about 3.5 miles east of Olla, 92 meters south of Louisiana Highway 124 on trail, 12 meters east of trail; SE1/4NE1/4 sec. 28, T. 11 N., R. 3 E.

[6] This pedon is an included soil in an area of Deerford silt loam, occasionally flooded. It is a fine, mixed, thermic Albic Glossic Natraqualf. It is about 13 miles south of Jena, 8 miles southwest of Louisiana Highway 28 from junction with U.S. Highway 84, 0.25 mile north on Diversion Canal levee, 60 feet northeast into woods from ditchbank; NE1/4NW1/4 sec. 30, T. 6 N., R. 4 E.

[7] This pedon is an included soil in an area of Ruston fine sandy loam, 3 to 8 percent slopes. It is a fine-loamy, siliceous, thermic Typic Paleudalf. It is about 4 miles northeast of Jena, 5.8 miles northeast on Louisiana Highway 459 from junction with U.S. Highway 84, 2.1 miles southeast on gravel road to pipeline, 162 feet northeast of pipeline from center of road, 45 feet southeast of center of pipeline corridor; SE1/4NE1/4 sec. 34, T. 9 N., R. 4 E.

[8] This pedon is an included soil in an area of Vick silt loam. It is a fine, mixed, thermic Glossaquic Hapludalf. It is about 1.3 miles southeast of Rogers, 0.5 mile west on Louisiana Highway 127 from junction with Louisiana Highway 776, 0.4 mile southwest on gravel road, 225 feet northwest from center of road; SE1/4SW1/4 sec. 6, T. 6 N., R. 3 E.

TABLE 19, PART I.--CHEMICAL TEST DATA FOR SELECTED SOILS

(The symbol < means less than. Dashes indicate that analyses were not made. The symbol TR means trace)

Soil name and sample number	Horizon	Depth	Extractable cations: Ca	Extractable cations: Mg	Extractable cations: K	Extractable cations: Na	Ex-tract-able acid-ity	Cation-exchange capacity NH4OAc	Base satura-tion NH4OAc	Sum of cation-exchange capacity	Sum of base satura-tion	Ex-tract-able alumi-num	Ex-tract-able hydro-gen	Aluminum saturation
		In	Meq/100g					Pct		Meq/100g	Pct	Meq/100g		Pct
Bayoudan silt loam:[1,3]														
(S84LA59-15)	Ap	0-4	5.4	2.8	<0.1	0.1	16.6	21.8	37.9	24.9	33.3	2.3	0.3	20.9
	Bw1	4-7	5.4	3.8	<0.1	0.1	15.5	21.7	42.9	24.8	37.5	4.5	0.6	31.0
	Bw2	7-11	8.3	6.3	0.1	0.3	18.7	30.6	42.1	33.7	44.5	6.8	0.2	30.9
	By1	11-24	16.3	10.0	0.4	1.1	20.2	43.2	64.4	48.0	57.9	6.1	0.1	17.9
	By2	24-37	20.0	14.2	0.4	2.2	18.4	47.6	77.3	55.6	66.6	3.7	0.5	9.0
	By3	37-50	20.0	16.7	0.6	3.5	16.6	45.2	90.3	57.4	71.1	1.5	0.7	3.5
	By4	50-68	68.8	15.8	0.6	3.5	14.4	47.0	188.7	103.1	86.0	0.5	0.2	0.5
	By5	68-85	71.3	18.3	0.8	4.3	12.6	48.9	167.9	94.7	86.7	0.0	0.0	0.0
Falkner silt loam:[1,4]														
(S84LA59-13)	Ap	0-4	2.0	1.3	<0.1	0.1	14.4	12.1	28.1	17.8	19.1	2.3	0.4	37.1
	Bt1	4-12	2.6	1.8	<0.1	0.8	14.8	15.0	34.7	20.0	26.0	5.8	0.3	50.9
	Bt2	12-17	1.3	1.5	<0.1	0.4	15.5	15.6	20.5	18.7	17.1	6.1	0.9	59.2
	Bt3	17-22	1.9	1.9	<0.1	1.3	14.4	15.4	33.1	19.5	26.2	5.8	0.6	50.0
	2Bt4	22-29	7.4	5.8	<0.1	1.8	15.8	30.6	49.0	30.8	48.7	5.1	0.8	24.3
	2Bt5	29-38	8.5	6.0	<0.1	2.2	11.5	27.0	61.9	28.2	59.2	1.8	0.4	9.5
	2Bt6	38-51	10.3	6.7	<0.1	2.9	7.2	24.7	80.6	27.1	73.4	0.0	0.0	0.0
	2Bt7	51-70	10.8	6.7	<0.1	3.0	5.8	23.8	86.1	26.3	78.0	0.0	0.0	0.0
Frizzell silt loam:[2,4]														
(S85LA59-21)	A	0-3	1.3	0.5	0.1	0.1	9.0	6.9	29.0	11.0	18.0	1.6	---	44.0
	E	3-7	0.9	0.4	TR	0.1	7.0	5.9	24.4	8.4	17.0	2.5	---	64.0
	Bt	7-18	0.5	0.5	TR	0.1	8.3	7.2	15.0	9.4	12.0	4.1	---	79.0
	B/E	18-29	0.3	0.5	TR	0.2	8.1	7.9	13.0	9.1	11.0	4.8	---	83.0
	B't1	29-39	1.0	1.4	0.1	0.8	12.2	13.1	25.0	15.5	21.0	7.3	---	69.0
	B't2	39-52	2.0	1.9	0.1	1.1	8.4	12.0	42.0	13.5	38.0	5.6	---	52.0
	B't3	52-64	3.3	2.4	TR	1.7	5.5	10.1	73.0	12.9	57.0	1.6	---	18.0
Libuse silt loam:[1,4]														
(S85LA59-8)	A	0-6	1.6	3.5	0.1	0.0	9.2	7.7	67.5	14.4	36.1	0.4	0.2	6.9
	E	6-12	0.8	2.7	0.1	0.1	7.4	6.8	54.4	11.1	33.3	1.7	0.4	29.3
	Bt1	12-22	0.8	2.5	0.1	0.1	10.5	11.5	30.4	14.0	25.0	5.2	0.1	59.1
	B/E	22-27	0.6	2.2	0.1	0.1	9.7	10.3	29.1	12.7	23.6	5.1	0.2	61.4
	Btx1	27-38	0.8	3.0	0.1	0.1	9.7	8.9	44.9	13.7	29.2	5.3	0.3	55.2
	Btx2	38-52	1.1	3.4	0.1	0.1	5.9	8.8	53.4	10.6	44.3	2.2	0.3	30.6
	Btx2	52-62	1.5	3.9	0.1	0.2	4.6	9.8	58.2	10.3	55.3	0.8	0.6	11.3
	Btx3	62-73	1.8	4.3	0.1	0.2	4.6	9.9	64.6	11.0	58.2	0.4	0.4	5.6
	Btx4	73-83	2.1	5.0	0.1	0.2	4.6	11.8	62.7	12.0	61.7	0.2	0.4	2.5
Oula very fine sandy loam:[1,4]														
	Ap	0-7	1.5	2.8	0.1	0.1	10.5	13.3	33.8	15.0	30.0	2.4	0.2	33.8
(S85LA59-10)	Bt1	7-15	3.6	10.5	0.3	0.1	19.7	26.9	53.9	34.2	42.4	9.4	0.0	39.3
	Bt2	15-24	4.4	12.6	0.3	0.1	22.7	37.7	46.2	40.1	43.4	10.7	0.3	37.7
	Bt3	24-40	4.3	12.6	0.3	0.3	19.7	35.6	49.2	37.2	47.0	9.0	0.1	33.8
	Bt4	40-58	3.9	11.5	0.3	0.2	16.4	28.8	55.2	32.3	49.2	6.4	0.4	28.2
	C	58-72	2.7	7.7	0.1	0.2	8.4	16.5	64.8	19.1	56.0	2.3	0.5	17.0

See footnotes at end of table.

TABLE 19, PART I.--CHEMICAL TEST DATA FOR SELECTED SOILS--Continued

Soil name and sample number	Horizon	Depth	Extractable cations				Extractable acidity	Cation-exchange capacity	Base saturation	Sum of cation-exchange capacity	Sum of base saturation	Extractable aluminum	Extractable hydrogen	Aluminum saturation
			Ca	Mg	K	Na		NH4OAc						
		In	Meq/100g					Pct		Meq/100g	Pct	Meq/100g		Pct
Providence silt loam:[2,4] (S84LA59-22)	Ap1	0-4	4.0	1.1	0.1	TR	5.9	7.9	66.0	11.1	47.0	---	---	---
	Ap2	4-8	2.5	2.0	0.1	0.1	4.6	8.0	59.0	9.3	51.0	0.3	---	6.0
	Bt1	8-18	2.1	3.9	0.2	0.2	9.2	11.2	57.0	15.6	41.0	2.1	---	25.0
	Bt2	18-25	0.7	3.1	0.2	0.2	9.7	11.0	38.0	13.9	30.0	3.7	---	47.0
	Bt3	25-31	0.4	4.6	0.2	0.4	9.8	11.6	48.0	15.4	36.0	3.1	---	36.0
	Btx1	31-39	0.2	6.5	0.2	0.5	9.6	13.5	55.0	17.0	44.0	3.0	---	29.0
	Btx2	39-47	0.2	6.0	0.1	0.5	8.0	11.2	61.0	14.8	46.0	1.9	---	22.0
	2Btx3	47-61	0.2	5.8	0.1	0.5	5.8	9.6	69.0	12.4	53.0	1.0	---	13.0
	2Btx4	61-71	0.2	4.8	0.1	0.4	4.0	7.8	71.0	9.5	58.0	0.8	---	13.0
	2Btx5	71-82	0.1	2.2	TR	0.2	3.7	3.8	66.0	6.2	40.0	0.5	---	17.0
Providence silt loam:[2,5] (S84LA59-20)	Ap	0-3	3.9	1.2	0.1	0.1	4.9	7.5	71.0	10.2	52.0	---	---	---
	BE	3-10	2.0	1.3	---	TR	5.3	6.4	52.0	8.6	38.0	0.1	---	3.0
	Bt1	10-19	3.8	2.5	0.1	0.1	6.4	9.5	68.0	12.9	50.0	0.8	---	11.0
	Bt2	19-29	3.1	2.3	0.1	0.2	7.2	9.4	61.0	12.9	44.0	1.9	---	25.0
	Bt3	29-35	2.0	1.7	0.1	0.2	8.8	9.7	41.0	12.8	31.0	4.0	---	50.0
	Btx1	35-40	1.6	1.5	0.1	0.3	8.3	9.2	38.0	11.8	30.0	4.3	---	55.0
	Btx2	40-55	2.3	2.0	TR	0.6	9.3	11.7	42.0	14.2	35.0	5.4	---	52.0
	Btx2	55-66	3.3	2.5	TR	0.7	8.2	11.6	56.0	14.7	44.0	3.7	---	36.0
	Bt4	66-80	5.8	3.9	0.1	1.1	6.9	13.9	78.0	17.8	61.0	1.7	---	13.0
Tippah silt loam:[2,4] (S84LA59-23)	Ap	0-5	1.9	0.4	0.1	0.1	6.6	6.8	37.0	9.1	27.0	1.4	---	36.0
	Bt1	5-12	1.2	1.1	0.1	0.1	12.6	10.3	24.0	15.1	17.0	5.5	---	69.0
	Bt2	12-18	0.7	1.4	TR	0.1	12.1	11.2	20.0	14.3	15.0	6.4	---	74.0
	Bt3	18-24	1.8	2.2	0.2	0.5	11.2	11.4	41.0	15.9	30.0	5.9	---	56.0
	2Bt4	24-31	6.5	7.5	0.3	1.0	15.5	26.3	58.0	30.8	50.0	8.2	---	35.0
	2Bt5	31-41	8.6	8.6	0.3	1.6	10.8	25.8	74.0	29.9	64.0	4.4	---	19.0
	2Bt6	41-49	12.8	13.1	0.5	3.1	9.8	33.0	89.0	39.3	75.0	2.7	---	8.0
	2Bt7	49-58	15.1	15.3	0.7	3.7	8.6	37.3	93.0	43.4	80.0	1.7	---	5.0
	2Bt8	58-63	16.3	16.5	0.8	4.0	7.9	39.0	96.0	45.5	83.0	1.1	---	3.0
	2BC	63-67	10.7	10.5	0.5	2.6	4.2	24.1	100.0	28.5	85.0	0.5	---	2.0
	2BC	67-70	17.6	17.6	0.9	4.3	5.1	37.2	100.0	45.5	89.0	0.4	---	1.0
Zenoria clay loam:[1,4] (S85LA59-9)	A1	0-2	1.6	2.8	0.3	0.1	22.7	26.9	17.8	27.5	17.5	10.2	0.4	66.2
	A2	2-10	0.9	2.5	0.2	0.1	23.9	27.4	13.5	27.6	13.4	17.1	0.0	82.2
	2B/Eb	10-19	0.3	0.6	0.1	0.1	10.7	10.3	10.7	11.8	9.3	7.0	0.3	83.3
	2Btgb1	19-33	0.3	0.4	0.1	0.1	10.9	9.5	9.5	11.8	7.6	7.5	0.3	86.2
	2Btgb2	33-52	0.1	0.3	0.1	0.1	11.8	9.5	6.3	12.4	4.8	7.9	0.0	92.9
	2BCb	52-67	0.1	0.2	0.1	0.1	11.8	10.3	4.9	12.3	4.1	8.3	0.0	94.3
	3C1	67-75	0.1	0.1	0.1	0.1	3.4	2.2	18.2	3.8	10.5	2.2	0.2	78.6
	3C2	75-80	0.1	0.1	0.1	0.1	1.5	1.3	30.8	1.9	21.1	1.2	0.2	66.7

See footnotes at end of table.

TABLE 19, PART I.--CHEMICAL TEST DATA FOR SELECTED SOILS--Continued

Soil name and sample number	Horizon	Depth	Extractable cations: Ca	Mg	K	Na	Extractable acidity	Cation-exchange capacity (NH4OAc)	Base saturation (NH4OAc)	Sum of cation-exchange capacity	Sum of base saturation	Extractable aluminum	Extractable hydrogen	Aluminum saturation
		In	Meq/100g					Pct		Meq/100g	Pct	Meq/100g		Pct
Series not designated:[1,6] (S84LA59-13)	A	0-4	4.5	2.1	<0.1	0.4	12.2	16.9	41.7	19.2	36.4	1.5	0.7	16.1
	E/B	4-12	5.0	3.6	<0.1	0.9	11.5	16.0	59.4	21.0	45.2	2.7	0.3	21.4
	B/E	12-22	5.4	4.8	<0.1	2.2	10.1	16.3	76.1	22.5	55.1	1.2	0.3	8.6
	Btn	22-35	7.5	7.2	0.1	5.1	6.5	22.5	88.4	26.4	75.4	0.0	0.0	0.0
	2Btnb1	35-42	8.5	9.6	0.1	7.8	5.4	21.5	120.9	31.4	82.8	0.0	0.0	0.0
	2Btnb2	42-58	9.0	13.6	0.2	9.6	6.5	27.5	117.8	38.9	83.3	0.0	0.0	0.0
	2Btnb3	58-65	10.0	10.4	0.1	7.8	5.0	22.1	128.1	33.3	85.0	0.0	0.0	0.0
	2BC	65-75	2.9	3.8	<0.1	3.5	2.5	12.6	81.0	12.7	80.3	0.0	0.0	0.0
Series not designated:[1,7] (S85LA59-11)	A	0-7	1.8	0.4	0.1	0.4	5.0	5.3	50.9	7.7	35.1	0.4	0.0	12.9
	E	7-13	1.4	0.3	0.1	0.4	2.7	3.3	66.7	4.9	44.9	0.2	0.1	8.0
	Bt1	13-26	1.6	2.2	0.2	0.4	7.7	7.8	56.4	12.1	36.4	3.2	0.1	41.6
	Bt2	26-42	1.2	2.0	0.1	0.5	5.6	7.7	49.4	9.4	40.4	2.4	0.1	38.1
	B/E	42-56	1.0	1.6	0.2	0.5	4.0	5.0	66.0	7.3	45.2	1.5	0.4	28.8
	B't	56-75	1.0	2.1	0.1	0.6	2.9	6.6	57.6	6.7	56.7	1.7	0.2	29.8
Series not designated:[1,8] (S85LA59-7)	A	0-3	1.0	1.3	0.0	0.0	8.3	7.6	30.3	10.6	21.7	0.8	0.4	22.9
	E/B	3-14	1.1	1.8	0.1	0.1	8.4	8.1	38.3	11.5	27.0	1.5	0.3	30.6
	B/E	14-23	1.2	2.5	0.1	0.2	8.6	10.8	37.0	12.6	31.7	2.4	0.1	36.9
	2Bt1	23-35	2.8	5.5	0.1	0.2	11.2	18.4	46.7	19.8	43.4	2.6	0.1	23.0
	2Bt2	35-44	3.0	5.7	0.1	0.3	7.5	15.9	57.2	16.6	54.8	1.1	0.3	10.5
	3Bt3	44-56	2.7	5.6	0.1	0.3	6.3	14.5	60.0	15.0	58.0	0.3	0.3	3.2
	3Bt4	56-65	3.1	6.2	0.1	0.4	6.0	15.2	64.5	15.8	62.0	0.2	0.2	2.0
	3Bt5	65-81	3.8	8.7	0.1	0.4	6.6	18.6	69.9	19.6	66.3	0.0	0.2	0.0
	3Bt6	81-91	4.9	11.1	0.2	0.5	6.8	22.8	73.2	23.5	71.1	0.0	0.2	0.0

[1] Analyses by the Soil Characterization Laboratory, Louisiana Agricultural Experiment Station.

[2] Analyses by the Soil Survey Investigations Staff, Soil Conservation Service, Lincoln, Nebraska.

[3] This pedon is an included soil in an area of Bayoudan silty clay loam, 5 to 15 percent slopes. It is about 2 miles southeast of Zenoria, 2.6 miles east on Louisiana Highway 500 from the Little River bridge, 0.15 mile north on gravel road, 100 feet east of road; SE1/4NW1/4 sec. 30, T. 9 N., R. 2 E.

[4] This is the typical pedon for the series in La Salle Parish. For the description and location of the soil, see the section "Soil Series and Their Morphology."

[5] This pedon is in an area of Providence silt loam, 1 to 3 percent slopes. It is not the typical pedon for the map unit. It is about 3.5 miles east of Olla, 92 meters south of Louisiana Highway 124 on trail, 12 meters east of trail; SE1/4NE1/4 sec. 28, T. 11 N., R. 3 E.

[6] This pedon is an included soil in an area of Deerford silt loam, occasionally flooded. It is a fine, mixed, thermic Albic Glossic Natraqualf. It is about 13 miles south of Jena, 8 miles southwest of Louisiana Highway 28 from junction with U.S. Highway 84, 0.25 mile north on Diversion Canal levee, 60 feet northeast into woods from ditchbank; NE1/4NW1/4 sec. 30, T. 6 N., R. 4 E.

[7] This pedon is an included soil in an area of Ruston fine sandy loam, 3 to 8 percent slopes. It is a fine-loamy, siliceous, thermic Typic Paleudalf. It is about 4 miles northeast of Jena, 5.8 miles northeast on Louisiana Highway 459 from junction with U.S. Highway 84, 2.1 miles southeast on gravel road to pipeline, 162 feet northeast of pipeline from center of road, 45 feet southeast of center of pipeline corridor; SE1/4NE1/4 sec. 34, T. 9 N., R. 4 E.

[8] This pedon is an included soil in an area of Vick silt loam. It is a fine, mixed, thermic Glossaquic Hapludalf. It is about 1.3 miles southeast of Rogers, 0.5 mile west on Louisiana Highway 127 from junction with Louisiana Highway 776, 0.4 mile southwest on gravel road, 225 feet northwest from center of road; SE1/4SW1/4 sec. 6, T. 6 N., R. 3 E.

TABLE 19, PART II.--CHEMICAL TEST DATA FOR SELECTED SOILS

(The symbol < means less than. Dashes indicate that analyses were not made)

Soil name and sample number	Horizon	Depth	Cation-exchange capacity/clay	15 bar water/clay	Organic carbon	pH 1:1 H_2O	pH 1:1 KCl	pH 1:2 $CaCl_2$	Extractable iron	Extractable phosphorus Bray 1	Extractable phosphorus Bray 2
		In			Pct				Pct	Ppm	Ppm
Bayoudan silt loam:[1,3] (S84LA59-15)	Ap	0-4	1.18	0.67	1.69	4.8	3.7	4.2	0.59	<1	3
	Bw1	4-7	0.75	0.56	0.46	4.6	3.5	4.2	0.76	<1	3
	Bw2	7-11	0.62	0.49	0.34	4.6	3.4	4.1	1.01	<1	3
	By1	11-24	0.68	0.48	0.35	4.5	3.4	4.0	0.96	<1	5
	By2	24-37	0.70	0.49	0.18	4.4	3.3	4.1	0.81	2	10
	By3	37-50	0.67	0.48	0.17	4.1	3.3	4.1	0.70	3	30
	By4	50-68	0.60	0.44	0.10	4.4	3.7	4.4	0.80	3	40
	By5	68-85	0.65	0.48	0.08	5.4	4.5	5.4	0.52	2	13
Falkner silt loam:[1,4] (S84LA59-13)	Ap	0-4	0.91	0.99	1.35	5.1	3.7	4.3	0.62	<1	6
	Bt1	4-12	0.64	0.63	0.37	5.0	3.6	4.1	0.86	<1	3
	Bt2	12-17	0.60	0.56	0.18	5.2	3.5	4.0	0.92	<1	5
	Bt3	17-22	0.58	0.50	0.15	5.4	3.5	4.1	0.92	<1	3
	2Bt4	22-29	0.69	0.49	0.14	5.1	3.4	4.3	0.95	<1	3
	2Bt5	29-38	0.73	0.49	0.11	5.0	3.4	4.4	0.95	<1	3
	2Bt6	38-51	0.79	0.53	0.07	5.9	4.6	5.5	0.79	<1	10
	2Bt7	51-70	0.73	0.51	0.04	6.9	6.1	6.5	0.59	<1	8
Frizzell silt loam:[2,4] (S85LA59-21)	A	0-3	0.76	0.62	1.81	4.7	3.8	4.1	0.80	---	---
	E	3-7	0.55	0.52	0.56	4.6	3.6	4.1	0.90	---	---
	Bt	7-18	0.49	0.48	0.32	4.6	3.5	4.0	1.00	---	---
	B/E	18-29	0.48	0.46	0.17	4.8	3.4	3.8	1.10	---	---
	B′t1	29-39	0.51	0.48	0.13	5.1	3.1	4.0	1.10	---	---
	B′t2	39-52	0.55	0.47	0.09	5.1	3.1	4.1	0.90	---	---
	B′t3	52-64	0.58	0.51	0.07	4.7	3.1	4.1	0.60	---	---
Libuse silt loam:[1,4] (S85LA59-8)	A	0-6	1.04	0.77	1.33	5.3	4.1	4.7	0.7	<1	18
	E	6-12	0.40	0.45	0.51	5.0	3.9	4.3	1.0	<1	19
	Bt	12-22	0.41	0.46	0.36	4.9	3.7	4.1	1.6	<1	9
	B/E	22-27	0.42	0.45	0.15	5.1	3.8	4.1	1.4	<1	<1
	Btx1	27-38	0.34	0.51	0.07	4.8	3.5	4.3	0.9	<1	<1
	Btx2	38-52	0.44	0.61	0.02	4.7	3.4	4.4	0.6	<1	<1
	Btx2	52-62	0.48	0.63	0.01	4.5	3.3	4.3	0.5	<1	<1
	Btx3	62-73	0.41	0.58	0.01	4.7	3.4	4.4	0.6	<1	<1
	Btx4	73-83	1.02	1.30	0.01	4.8	3.6	4.6	0.6	<1	<1

See footnotes at end of table.

TABLE 19, PART II.--CHEMICAL TEST DATA FOR SELECTED SOILS--Continued

Soil name and sample number	Horizon	Depth	Cation-exchange capacity/ clay	15 bar water/ clay	Organic carbon	pH			Extractable iron	Extractable phosphorus	
						1:1 H_2O	1:1 KCl	1:2 $CaCl_2$		Bray 1	Bray 2
		In			Pct				Pct	Ppm	Ppm
Oula very fine sandy loam:[1,4] (S85LA59-10)	Ap	0-7	0.82	0.48	1.22	4.7	3.6	4.2	0.5	<1	18
	Bt1	7-15	0.53	0.40	0.38	4.1	3.2	4.0	0.7	<1	18
	Bt2	15-24	0.62	0.40	0.20	3.8	3.2	3.8	0.4	<1	<1
	Bt3	24-40	0.63	0.39	0.12	3.7	3.0	3.7	0.3	<1	<1
	Bt4	40-58	0.60	0.40	0.06	3.7	3.0	3.7	0.4	<1	<1
	C	58-72	0.45	0.36	0.02	3.7	3.0	3.7	0.1	<1	4
Providence silt loam:[2,4] (S84LA59-22)	Ap1	0-4	0.78	0.57	1.88	6.2	5.3	5.7	0.6	---	---
	Ap2	4-8	0.51	0.43	0.45	5.2	4.0	4.5	1.3	---	---
	Bt1	8-18	0.38	0.44	0.22	5.1	3.6	4.3	1.9	---	---
	Bt2	18-25	0.45	0.47	0.13	5.1	3.6	4.1	2.1	---	---
	Bt3	25-31	0.49	0.50	0.07	5.3	3.5	4.3	2.1	---	---
	Btx1	31-39	0.51	0.45	0.08	5.2	3.2	4.3	1.6	---	---
	Btx2	39-47	0.54	0.47	0.08	5.1	3.1	4.1	1.2	---	---
	2Btx3	47-61	0.48	0.49	0.06	4.9	3.1	4.1	1.1	---	---
	2Btx4	61-71	0.48	0.47	0.04	5.1	3.2	4.3	0.9	---	---
	2Btx5	71-82	0.36	0.42	0.04	5.1	3.4	4.3	0.8	---	---
Providence silt loam:[2,5] (S84LA59-20)	Ap	0-3	0.69	0.59	1.65	6.0	5.5	5.8	0.9	---	---
	BE	3-10	0.42	0.47	0.40	5.3	4.4	4.9	1.4	---	---
	Bt1	10-19	0.40	0.47	0.29	4.9	3.8	4.4	2.0	---	---
	Bt2	19-29	0.43	0.47	0.14	4.9	3.6	4.3	1.9	---	---
	Bt3	29-35	0.44	0.46	0.11	4.8	3.4	4.0	1.7	---	---
	Btx1	35-40	0.46	0.46	0.11	4.8	3.4	4.2	1.7	---	---
	Btx2	40-55	0.49	0.45	0.12	4.8	3.2	3.9	1.3	---	---
	Btx2	55-66	0.49	0.45	0.10	4.9	3.2	4.1	1.4	---	---
	Bt4	66-80	0.52	0.47	0.08	4.9	3.2	4.3	1.5	---	---
Tippah silt loam:[2,4] (S84LA59-23)	Ap	0-5	0.76	0.60	1.55	4.9	3.8	4.2	0.9	---	---
	Bt1	5-12	0.45	0.47	0.41	4.7	3.5	4.3	1.8	---	---
	Bt2	12-18	0.46	0.48	0.27	4.8	3.4	4.2	2.0	---	---
	Bt3	18-24	0.45	0.48	0.21	5.0	3.3	4.1	1.9	---	---
	2Bt4	24-31	0.59	0.50	0.17	4.8	3.0	4.2	1.7	---	---
	2Bt5	31-41	0.64	0.48	0.19	4.5	3.0	4.3	1.2	---	---
	2Bt6	41-49	0.68	0.45	0.19	4.2	3.2	4.3	0.8	---	---
	2Bt7	49-58	0.71	0.46	0.16	4.3	3.3	4.3	0.5	---	---
	2Bt8	58-63	0.70	0.46	0.13	4.6	3.4	4.6	0.4	---	---
	2BC	63-67	0.73	0.54	0.07	4.8	3.6	4.7	0.7	---	---
	2BC	67-70	0.69	0.50	0.09	4.8	3.8	4.8	0.7	---	---

See footnotes at end of table.

TABLE 19, PART II.--CHEMICAL TEST DATA FOR SELECTED SOILS--Continued

Soil name and sample number	Horizon	Depth	Cation-exchange capacity/clay	15 bar water/clay	Organic carbon	pH 1:1 H_2O	pH 1:1 KCl	pH 1:2 $CaCl_2$	Extractable iron	Extractable phosphorus Bray 1	Extractable phosphorus Bray 2
		In			Pct				Pct	Ppm	Ppm
Zenoria clay loam:[1,4] (S85LA59-9)	A1	0-2	0.59	0.35	1.80	4.2	3.3	3.8	0.4	<1	18
	A2	2-10	0.49	0.44	0.93	4.1	3.0	3.7	1.0	<1	9
	2B/Eb	10-19	0.47	0.48	0.35	4.3	3.2	3.7	0.3	<1	<1
	2Btgb1	19-33	0.39	0.48	0.26	4.6	3.3	3.7	0.6	<1	<1
	2Btgb2	33-52	0.45	0.53	0.12	4.4	3.3	3.7	0.9	<1	<1
	2BCb	52-67	0.56	0.54	0.08	4.1	3.2	3.6	0.6	<1	<1
	3C1	67-75	0.54	0.66	0.02	4.5	3.5	3.8	0.1	<1	<1
	3C2	75-80	0.31	0.40	0.01	4.5	3.7	3.9	0.0	<1	<1
Series not designated:[1,6] (S84LA59-13)	A	0-4	1.23	1.10	2.25	5.0	3.7	4.4	0.25	9	10
	E/B	4-12	0.63	0.64	0.46	4.9	3.5	4.2	0.72	<1	8
	B/E	12-22	0.54	0.66	0.25	5.2	3.6	4.6	0.93	<1	3
	Btn	22-35	0.57	0.57	0.17	6.6	5.6	6.0	0.97	<1	5
	2Btnb1	35-42	0.54	0.51	0.19	6.9	6.4	6.9	0.62	<1	8
	2Btnb2	42-58	0.61	0.52	0.07	7.7	6.7	7.3	0.66	<1	3
	2Btnb3	58-65	0.73	0.63	0.07	8.0	6.9	7.5	0.53	6	35
	2BC	65-75	1.24	0.72	0.04	7.9	6.9	7.4	0.38	20	58
Series not designated:[1,7] (S85LA59-11)	A	0-7	1.33	0.95	1.07	5.3	4.4	4.8	0.3	<1	9
	E	7-13	0.80	1.05	0.62	5.5	4.4	4.6	0.2	<1	<1
	Bt1	13-26	0.30	0.46	0.27	4.9	3.8	4.2	1.2	<1	<1
	Bt2	26-42	0.37	0.48	0.15	4.9	3.7	4.2	0.7	<1	<1
	B/E	42-56	0.35	0.53	0.08	5.1	3.8	4.2	0.6	<1	<1
	B't	56-75	0.40	0.53	0.03	5.0	3.8	4.2	0.6	<1	<1

See footnotes at end of table.

TABLE 19, PART II.--CHEMICAL TEST DATA FOR SELECTED SOILS--Continued

Soil name and sample number	Horizon	Depth	Cation-exchange capacity/ clay	15 bar water/ clay	Organic carbon	pH 1:1 H_2O	pH 1:1 KCl	pH 1:2 $CaCl_2$	Extractable iron	Extractable phosphorus Bray 1	Extractable phosphorus Bray 2
		In			Pct				Pct	Ppm	Ppm
Series not designated:[1,8] (S85LA59-7)	A	0-3	0.78	0.63	1.24	4.9	3.9	4.5	0.8	14	27
	E/B	3-14	0.54	0.47	0.66	4.9	3.7	4.6	0.9	10	18
	B/E	14-23	0.51	0.42	0.50	4.8	3.6	4.6	1.1	<1	9
	2Bt1	23-35	0.48	0.42	0.33	4.8	3.5	4.7	1.3	<1	9
	2Bt2	35-44	0.38	0.34	0.20	4.7	3.5	4.7	1.0	<1	9
	3Bt3	44-56	0.52	0.46	0.14	4.7	3.7	4.7	0.6	<1	4
	3Bt4	56-65	0.87	0.78	0.10	5.1	4.1	5.1	0.6	<1	<1
	3Bt5	65-81	0.62	0.46	0.06	5.8	4.8	5.8	0.8	<1	<1
	3Bt6	81-91	0.62	0.38	0.02	6.1	5.1	6.1	0.7	<1	4

[1] Analyses by the Soil Characterization Laboratory, Louisiana Agricultural Experiment Station.

[2] Analyses by the Soil Survey Investigations Staff, Soil Conservation Service, Lincoln, Nebraska.

[3] This pedon is an included soil in an area of Bayoudan silty clay loam, 5 to 15 percent slopes. It is about 2 miles southeast of Zenoria, 2.6 miles east on Louisiana Highway 500 from the Little River bridge, 0.15 mile north on gravel road, 100 feet east of road; SE1/4NW1/4 sec. 30, T. 9 N., R. 2 E.

[4] This is the typical pedon for the series in La Salle Parish. For the description and location of the soil, see the section "Soil Series and Their Morphology."

[5] This pedon is in an area of Providence silt loam, 1 to 3 percent slopes. It is not the typical pedon for the map unit. It is about 3.5 miles east of Olla, 92 meters south of Louisiana Highway 124 on trail, 12 meters east of trail; SE1/4NE1/4 sec. 28, T. 11 N., R. 3 E.

[6] This is an included soil in an area of Deerford silt loam, occasionally flooded. It is a fine, mixed, thermic Albic Glossic Natraqualf. It is about 13 miles south of Jena, 8 miles southwest of Louisiana Highway 28 from junction with U.S. Highway 84, 0.25 mile north on Diversion Canal levee, 60 feet northeast into woods from ditchbank; NE1/4NW1/4 sec. 30, T. 6 N., R. 4 E.

[7] This pedon is an included soil in an area of Ruston fine sandy loam, 3 to 8 percent slopes. It is a fine-loamy, siliceous, thermic Typic Paleudalf. It is about 4 miles northeast of Jena, 5.8 miles northeast on Louisiana Highway 459 from junction with U.S. Highway 84, 2.1 miles southeast on gravel road to pipeline, 162 feet northeast of pipeline from center of road, 45 feet southeast of center of pipeline corridor; SE1/4NE1/4 sec. 34, T. 9 N., R. 4 E.

[8] This pedon is an included soil in an area of Vick silt loam. It is a fine, mixed, thermic Glossaquic Hapludalf. It is about 1.3 miles southeast of Rogers, 0.5 miles west on Louisiana Highway 127 from junction with Louisiana Highway 776, 0.4 mile southwest on gravel road, 225 feet northwest from center of road; SE1/4SW1/4 sec. 6, T. 6 N., R. 3 E.

TABLE 20.--MINERALOGY DATA FOR SELECTED SOILS

(Analyses by the Soil Characterization Laboratory, Louisiana Agricultural Experiment Station. The symbol < means less than; > means more than)

Soil name and sample number	Depth	Horizon	Very fine sand and silt fraction[1] 100-50, 50-2.0	Clay fraction <0.2
	In		Microns	
Bayoudan silt loam:[2]				
(S84LA59-15)	4-7	Bw1		Sm: >50; K: 20-30; Mic: <10; Int: <10
	7-11	Bw2		Sm: >50; K: 20-30; Mic: <10; Int: <10
	11-24	By1		Sm: >50; K: 20-30; Mic: <10; Int: <10
	24-37	By2		Sm: >50; K: 20-30; Mic: <10; Int: <10
Falkner silt loam:[3] (S84LA59-13)	12-17	Bt2	Q: >90; FeO: <5; Mic: <3; F: <3; ON: <5	
	17-22	Bt3	Q: >90; FeO: <5; Mic: <3; F: <3; ON: <5	
	22-29	2Bt4	Q: >90; FeO: <5; Mic: <3; F: <3; ON: <5	
Libuse silt loam:[3] (S85LA59-8)	12-22	Bt1	Q: >95; K: 2; ON: 1	
	22-27	B/E	Q: >95; K: 2; ON: 1	
Oula very fine sandy loam:[3]	7-15	Bt1		Sm: 65; K: 15; Mic: <5; V: 10; Q: 5; Go: 5; Gi: <5
(S85LA59-10)	15-24	Bt2		Sm: 80-85: K: 10; Q: <5; Go: <5
	24-40	Bt3		Sm: 75; K: 15; Q: 5; Go: 5
Zenoria clay loam:[3] (S85LA59-9)	10-19	2B/Eb	Q: 90-97; K: 2; ON: 1	
	19-33	2Btgb1	Q: 90-97; K: 2; ON: 1	
	33-52	2Btgb2	Q: 90-97; K: 2; ON: 1	
Series not designated:[4]				
(S84LA59-13)	22-35	Btn	Q: >90; FeO: <5; F: <3; Mic: <3; ON: <5	Sm: 35; K: 30; Mic: 20; Int: 15
	35-42	2Btnb1	Q: >90; FeO: <5; F: <3; Mic: <3; ON: <5	Sm: 35; K: 30; Mic: 20; Int: 15
	42-58	2Btnb2	Q: >90; FeO: <5; F: <3; Mic: <3; ON: <5	Sm: 35; K: 30; Mic: 20; Int: 15
Series not designated:[5]	13-26	Bt1	Q: 86-97; K: 2-10; ON: 1; Pg: 3	
(S85LA59-11)	26-42	Bt2	Q: 91; K: 8; Pg: 1; ON: Trace	
	42-56	B/E	Q: 92; K: 6; Pg: 2; ON: Trace	

See footnotes at end of table.

TABLE 20.--MINERALOGY DATA FOR SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Very fine sand and silt fraction[1] 100-50, 50-2.0	Clay fraction <0.2
	In		---Microns---	
Series not designated:[6] (S85LA59-7)	3-14	E/B	Q: 95-97; K: 2; ON: 1-2	
	14-23	B/E	Q: 97; K: 2; ON: 1	
	23-35	2Bt1	Q: 97; K: 2; ON: Trace	

[1] Code for mineralogical data in Very fine sand and silt fraction and Clay fraction columns: The letters represent the kind of mineral, and the number represents the quantity in percent.

Kind of mineral:

F--feldspars
Gi--gibbsite
Go--geothite
K--kaolinite
Pg--plagioclase
Q--quartz
V--vermiculite
Mic--mica
FeO--iron oxides
Sm--smectite
Int--interstratified (2:1-2:2)
OW--other weatherable
ON--other nonweatherable

[2] This pedon is an included soil in an area of Bayoudan silty clay loam, 5 to 15 percent slopes. It is about 2 miles southeast of Zenoria, 2.6 miles east on Louisiana Highway 500 from the Little River bridge, 0.15 mile north on gravel road, 100 feet east of road; SE1/4NW1/4 sec. 30, T. 9 N., R. 2 E.

[3] This is the typical pedon for the series in La Salle Parish. For the description and location of the soil, see the section "Soil Series and Their Morphology."

[4] This pedon is an included soil in an area of Deerford silt loam, occasionally flooded. It is a fine, mixed, thermic Albic Glossic Natraqualf. It is about 13 miles south of Jena, 8 miles southwest of Louisiana Highway 28 from junction with U.S. Highway 84, 0.25 mile north on Diversion Canal levee, 60 feet northeast into woods from ditchbank; NE1/4NW1/4 sec. 30, T. 6 N., R. 4 E.

[5] This pedon is an included soil in an area of Ruston fine sandy loam, 3 to 8 percent slopes. It is a fine-loamy, siliceous, thermic Typic Paleudalf. It is about 4 miles northeast of Jena, 5.8 miles northeast on Louisiana Highway 459 from junction with U.S. Highway 84, 2.1 miles southeast on gravel road to pipeline, 162 feet northeast of pipeline from center of road, 45 feet southeast of center of pipeline corridor; SE1/4NE1/4 sec. 34, T. 9 N., R. 4 E.

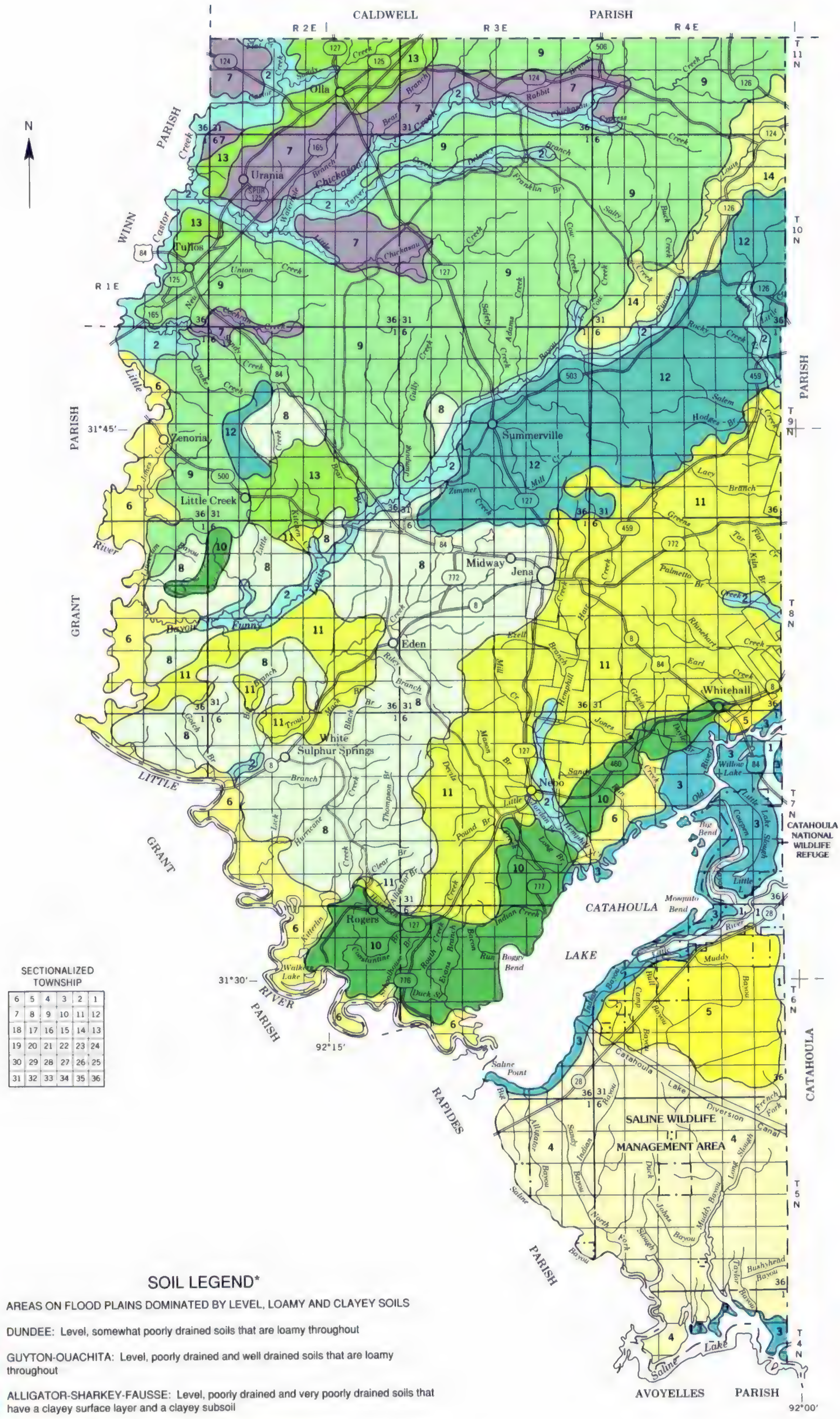
[6] This pedon is an included soil in an area of Vick silt loam. It is a fine, mixed, thermic Glossaquic Hapludalf. It is about 1.3 miles southeast of Rogers, 0.5 mile west on Louisiana Highway 127 from junction with Louisiana Highway 776, 0.4 mile southwest on gravel road, 225 feet northwest from center of road; SE1/4SW1/4 sec. 6, T. 6 N., R. 3 E.

TABLE 21.--CLASSIFICATION OF THE SOILS

(An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series)

Soil name	Family or higher taxonomic class
Alligator	Very fine, montmorillonitic, acid, thermic Vertic Haplaquepts
Bayoudan	Very fine, montmorillonitic, thermic Aquentic Chromuderts
Bienville	Sandy, siliceous, thermic Psammentic Paleudalfs
*Bursley	Fine-silty, mixed, thermic Aeric Glossaqualfs
Cahaba	Fine-loamy, siliceous, thermic Typic Hapludults
*Deerford	Fine-silty, mixed, thermic Albic Glossic Natraqualfs
Dundee	Fine-silty, mixed, thermic Aeric Ochraqualfs
*Falkner	Fine-silty, siliceous, thermic Aquic Paleudalfs
Fausse	Very fine, montmorillonitic, nonacid, thermic Typic Fluvaquents
Foley	Fine-silty, mixed, thermic Albic Glossic Natraqualfs
Forestdale	Fine, montmorillonitic, thermic Typic Ochraqualfs
Frizzell	Coarse-silty, siliceous, thermic Glossaquic Hapludalfs
Gore	Fine, mixed, thermic Vertic Paleudalfs
Guyton	Fine-silty, siliceous, thermic Typic Glossaqualfs
Hollywood	Fine, montmorillonitic, thermic Typic Pelluderts
Jena	Coarse-loamy, siliceous, thermic Fluventic Dystrochrepts
*Keithville	Fine-silty, siliceous, thermic Glossaquic Paleudalfs
Kisatchie	Fine, montmorillonitic, thermic Typic Hapludalfs
*Kurth	Fine-loamy, siliceous, thermic Aquic Glossudalfs
Lexington	Fine-silty, mixed, thermic Typic Paleudalfs
Libuse	Fine-silty, siliceous, thermic Typic Fragiudalfs
Malbis	Fine-loamy, siliceous, thermic Plinthic Paleudults
Ouachita	Fine-silty, siliceous, thermic Fluventic Dystrochrepts
Oula	Fine, montmorillonitic, thermic Vertic Hapludalfs
Pheba	Coarse-silty, siliceous, thermic Glossaquic Fragiudults
Providence	Fine-silty, mixed, thermic Typic Fragiudalfs
Ruston	Fine-loamy, siliceous, thermic Typic Paleudults
Sacul	Clayey, mixed, thermic Aquic Hapludults
Savannah	Fine-loamy, siliceous, thermic Typic Fragiudults
*Sharkey	Very fine, montmorillonitic, nonacid, thermic Vertic Haplaquepts
*Shatta	Fine-silty, siliceous, thermic Typic Fragiudults
Smithdale	Fine-loamy, siliceous, thermic Typic Hapludults
Tensas	Fine, montmorillonitic, thermic Aeric Ochraqualfs
Tippah	Fine-silty, mixed, thermic Aquic Paleudalfs
Una	Fine, mixed, acid, thermic Typic Haplaquepts
*Vick	Fine-silty, siliceous, thermic Glossaquic Hapludalfs
Zenoria	Fine-loamy, siliceous, thermic Aeric Ochraqualfs

NRCS Accessibility Statement



SOIL LEGEND*

AREAS ON FLOOD PLAINS DOMINATED BY LEVEL, LOAMY AND CLAYEY SOILS

1 DUNDEE: Level, somewhat poorly drained soils that are loamy throughout

2 GUYTON-OUACHITA: Level, poorly drained and well drained soils that are loamy throughout

3 ALLIGATOR-SHARKEY-FAUSSE: Level, poorly drained and very poorly drained soils that have a clayey surface layer and a clayey subsoil

AREAS ON FLOOD PLAINS AND LOW STREAM TERRACES DOMINATED BY LEVEL AND NEARLY LEVEL, LOAMY SOILS

4 BURSLEY-FORESTDALE-FOLEY: Level, poorly drained soils that have a loamy surface layer and a loamy or a clayey and loamy subsoil

5 DEERFORD-FORESTDALE: Level, somewhat poorly drained and poorly drained soils that have a loamy surface layer and a loamy or a clayey and loamy subsoil

6 UNA-ZENORIA: Level and nearly level, poorly drained soils that have a loamy surface layer and a clayey and loamy or a loamy subsoil

AREAS ON STREAM TERRACES AND ON UPLANDS DOMINATED BY LEVEL TO MODERATELY SLOPING, LOAMY SOILS

7 FRIZZELL-PROVIDENCE-GUYTON: Level to moderately sloping, somewhat poorly drained, moderately well drained, and poorly drained soils that are loamy throughout

AREAS ON UPLANDS DOMINATED BY NEARLY LEVEL TO STEEP, LOAMY AND CLAYEY SOILS

8 RUSTON-PHEBA-SAVANNAH: Nearly level to moderately sloping, well drained, somewhat poorly drained, and moderately well drained soils that are loamy throughout

9 FALKNER-TIPPAH-BAYOUDAN: Nearly level to steep, somewhat poorly drained and moderately well drained soils that have a loamy or clayey surface layer and a loamy and clayey or a clayey subsoil

10 LIBUSE-GORE-VICK: Nearly level to moderately steep, moderately well drained and somewhat poorly drained soils that have a loamy surface layer and a loamy, a clayey, or a loamy and clayey subsoil

11 SMITHDALE-RUSTON-PROVIDENCE: Very gently sloping to steep, well drained and moderately well drained soils that are loamy throughout

12 OULA-KISATCHIE-PROVIDENCE: Very gently sloping to steep, moderately well drained and well drained soils that have a loamy surface layer and a clayey, a loamy and clayey, or a loamy subsoil

13 KEITHVILLE-SACUL-MALBIS: Gently sloping to moderately steep, moderately well drained soils that have a loamy surface layer and a loamy and clayey or a clayey subsoil

14 PROVIDENCE: Very gently sloping and moderately sloping, moderately well drained soils that are loamy throughout

* The texture terms used in the group headings refer to the surface layer of the major soils.

Compiled 1990

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
LOUISIANA AGRICULTURAL EXPERIMENT STATION
LOUISIANA SOIL AND WATER CONSERVATION COMMITTEE

GENERAL SOIL MAP

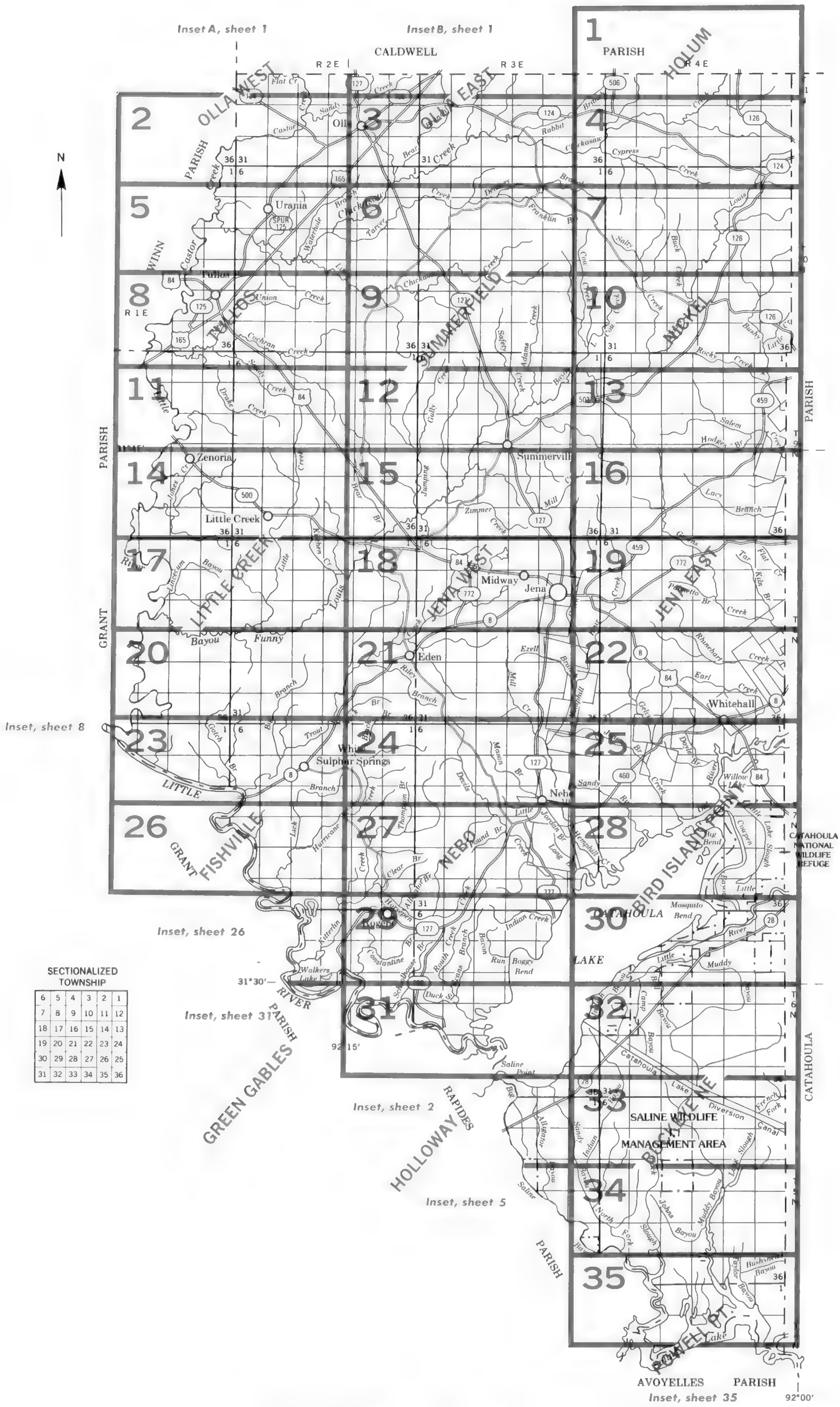
LA SALLE PARISH, LOUISIANA

Scale 1:190,080

1 0 1 2 3 Mi

1 0 3 6 Km

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.



Original text from each individual map sheet read:
This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

INDEX TO MAP SHEETS

LA SALLE PARISH, LOUISIANA

Scale 1:190,080

1 0 1 2 3 Mi

1 0 3 6 Km

SOIL LEGEND

Soil map symbols and map unit names are alphabetical. Map symbols are letters. The first letter, always a capital, is the initial letter of the soil series name. The second letter is a small letter except in Order three map units, in which case it is a capital letter.

SYMBOL	NAME
Ag	Alligator clay, occasionally flooded
At	Alligator clay, frequently flooded
Bb	Bayoudan silt loam, 1 to 5 percent slopes
Bc	Bayoudan silty clay loam, 5 to 15 percent slopes
Bd	Bayoudan clay, 15 to 40 percent slopes
Be	Bienville loamy fine sand, 1 to 3 percent slopes
Br	Bursley silt loam
Bs	Bursley silt loam, occasionally flooded
Ch	Cahaba fine sandy loam, 1 to 3 percent slopes
Da	Deerford silt loam
Db	Deerford silt loam, occasionally flooded
Dd	Dundee loam
Fa	Falkner silt loam
Fc	Fausse clay, frequently flooded
Fe	Foley silt loam, occasionally flooded
Ff	Forestdale silty clay loam
Fh	Forestdale silty clay loam, occasionally flooded
Fr	Frizzell silt loam
Go	Gore silt loam, 5 to 15 percent slopes
Gu	Guyton silt loam
GY	Guyton and Ouachita soils, frequently flooded 1/
Hw	Hollywood clay, 1 to 5 percent slopes
Ke	Keithville very fine sandy loam, 1 to 5 percent slopes
Ks	Kisatchie-Oula complex, 8 to 40 percent slopes
Ku	Kurth fine sandy loam, 1 to 5 percent slopes
Le	Lexington silt loam, 1 to 3 percent slopes
Lf	Libuse silt loam, 1 to 5 percent slopes
Mb	Malbis fine sandy loam, 1 to 5 percent slopes
OE	Ouachita and Jena soils, frequently flooded 1/
Ou	Oula fine sandy loam, 5 to 20 percent slopes
Pb	Pheba loam
Pg	Pits, gravel
Pr	Providence silt loam, 1 to 3 percent slopes
Pv	Providence silt loam, 3 to 8 percent slopes
Rs	Ruston fine sandy loam, 1 to 3 percent slopes
Rt	Ruston fine sandy loam, 3 to 8 percent slopes
Sa	Sacul fine sandy loam, 1 to 5 percent slopes
Sb	Sacul fine sandy loam, 5 to 20 percent slopes
Sf	Savannah fine sandy loam, 1 to 5 percent slopes
Sh	Sharkey clay, frequently flooded
Sk	Shatta very fine sandy loam, 1 to 5 percent slopes
Sm	Smithdale fine sandy loam, 12 to 30 percent slopes
Te	Tensas silty clay, occasionally flooded
Tp	Tippah silt loam, 1 to 5 percent slopes
Un	Una silty clay loam, frequently flooded
Vk	Vick silt loam
Ze	Zenona clay loam, occasionally flooded

1/ Order three map units. Fewer soil examinations were made in these mapping units, and delineations and included areas are generally larger. These mapping units were designed primarily for woodland and wildlife habitat management.

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline and neatline

AD HOC BOUNDARY (label) — Smith Airport

- Small airport, airfield, park, oilfield, cemetery, or flood pool — FLOOD POOL LINE

STATE COORDINATE TICK

LAND DIVISION CORNER (sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEM & DESIGNATIONS

- Interstate — 21
- Federal — 173
- State — 28
- County, farm or ranch — 1283

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad

DAMS

- Large (to scale)
- Medium or Small — water, w

PITS

- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban areas)
- Church
- School
- Indian mound (label) — Indian Mound
- Located object (label) — Tower
- Tank (label) — Gas
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label) — CANAL
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial — water, w
- Intermittent — int, i

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS — Rs, Sk

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

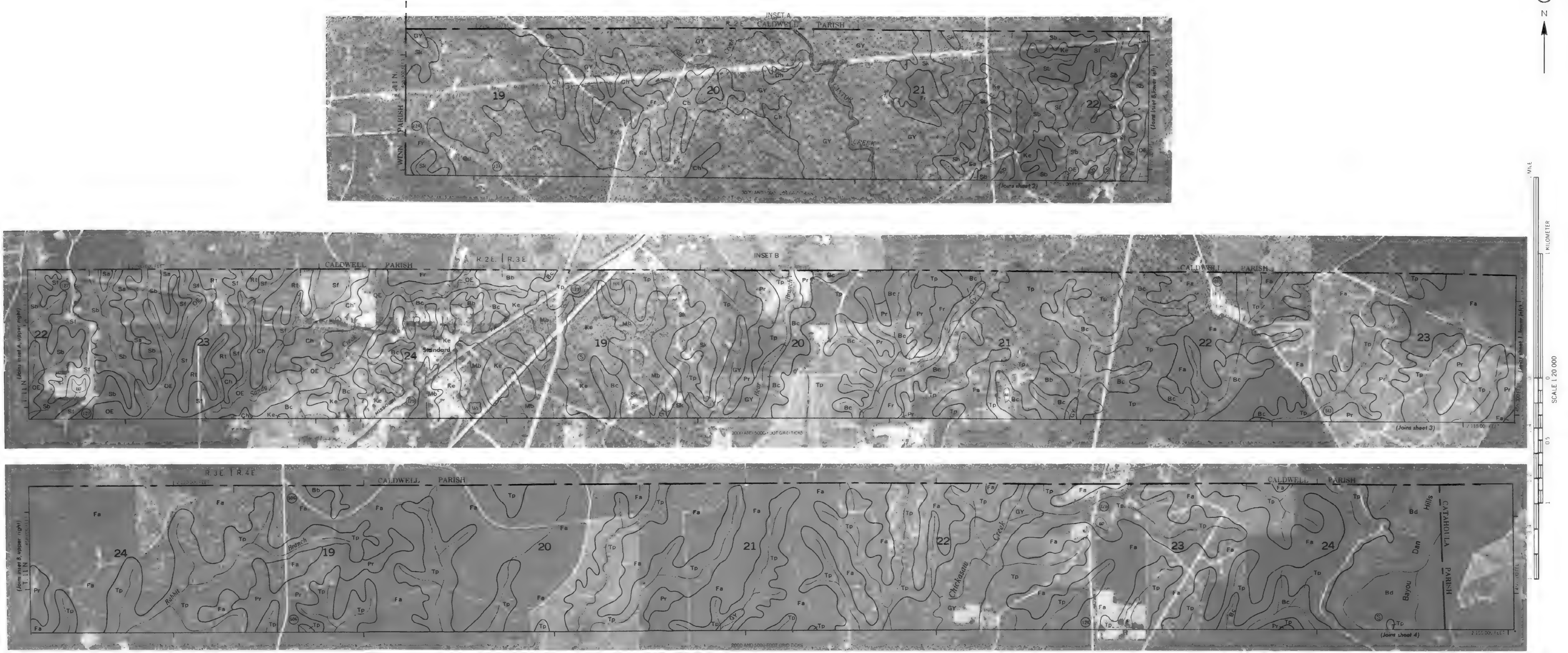
GULLY

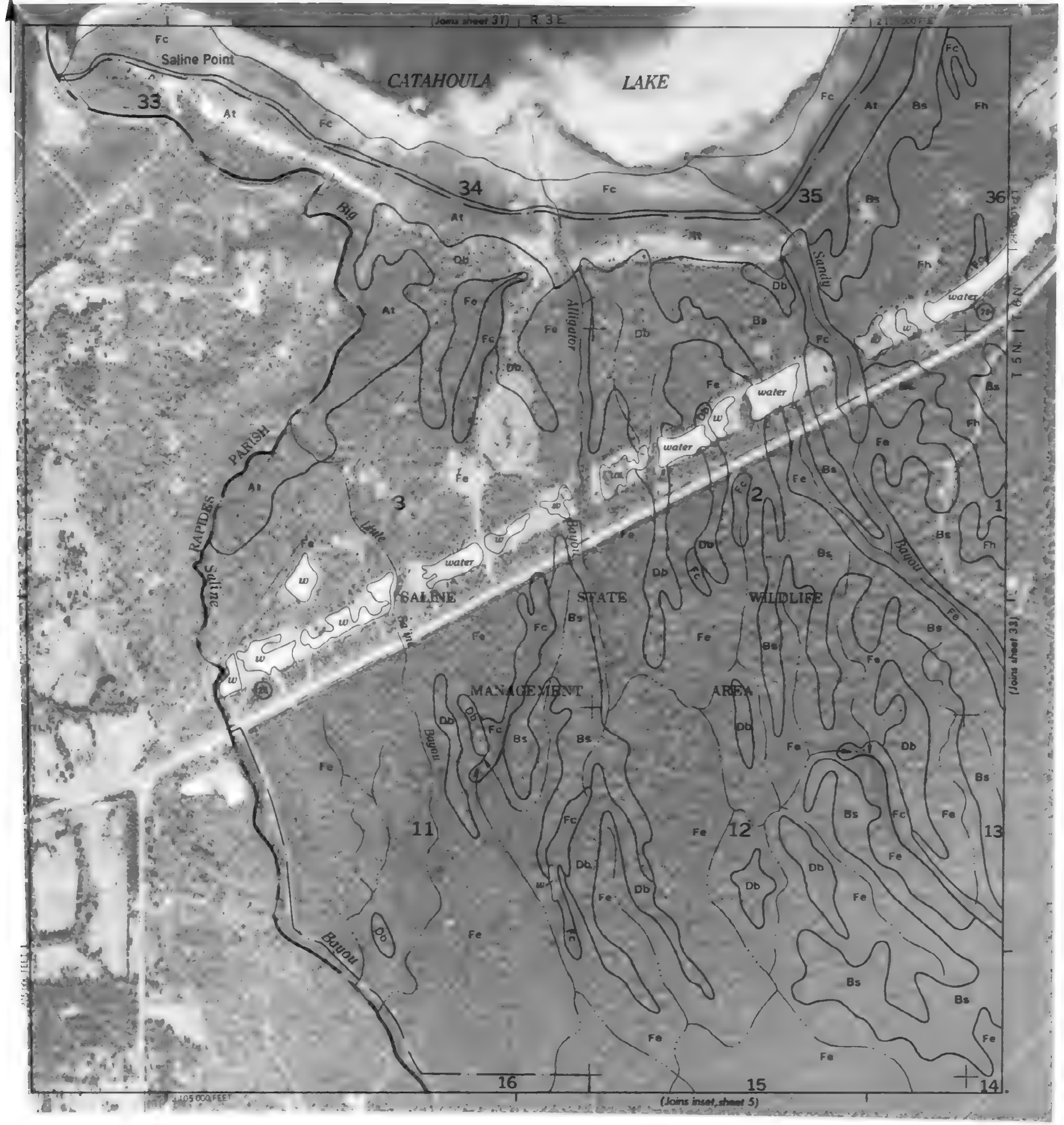
DEPRESSION OR SINK

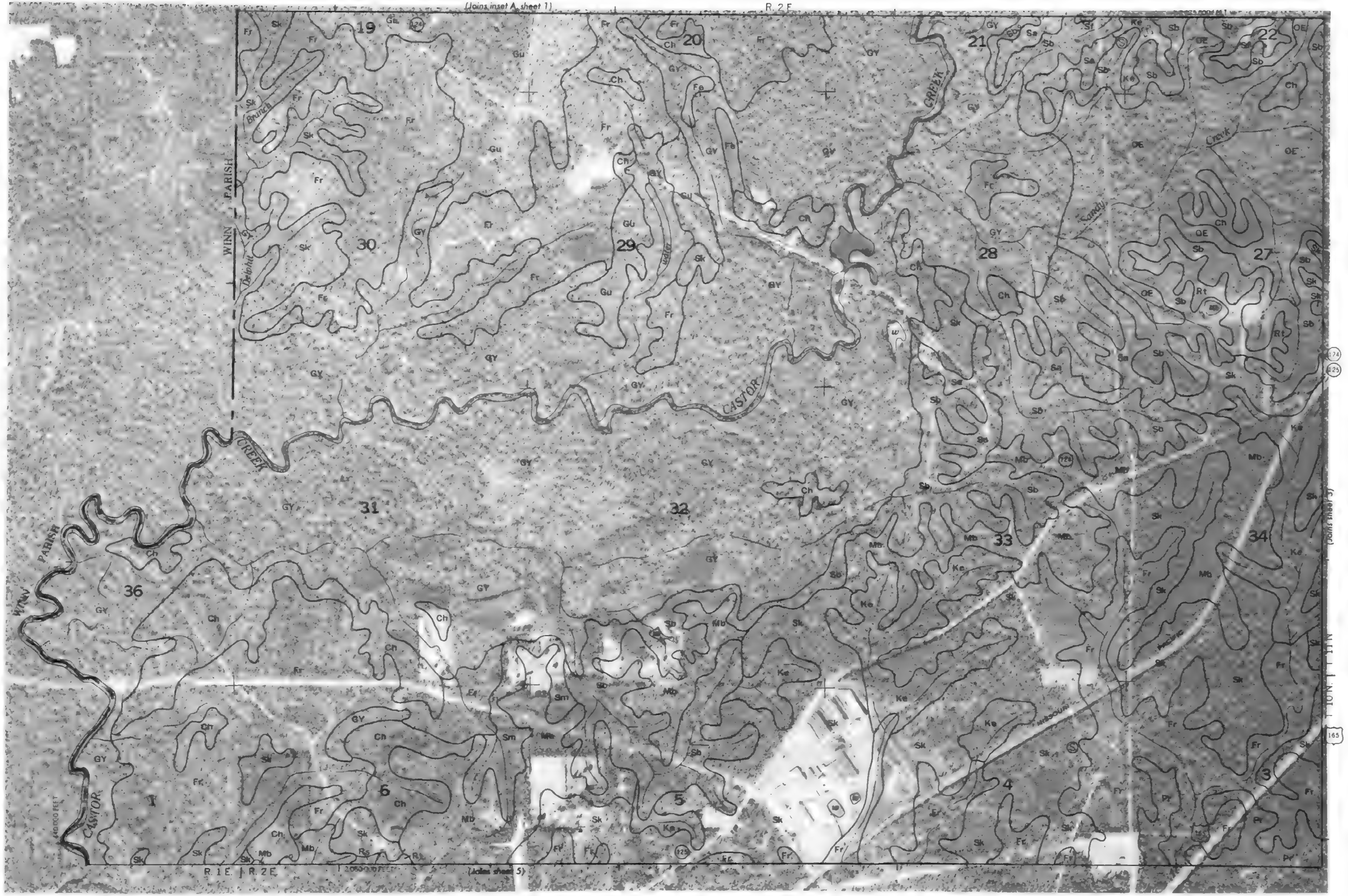
SOIL SAMPLE (normally not shown) — S

MISCELLANEOUS

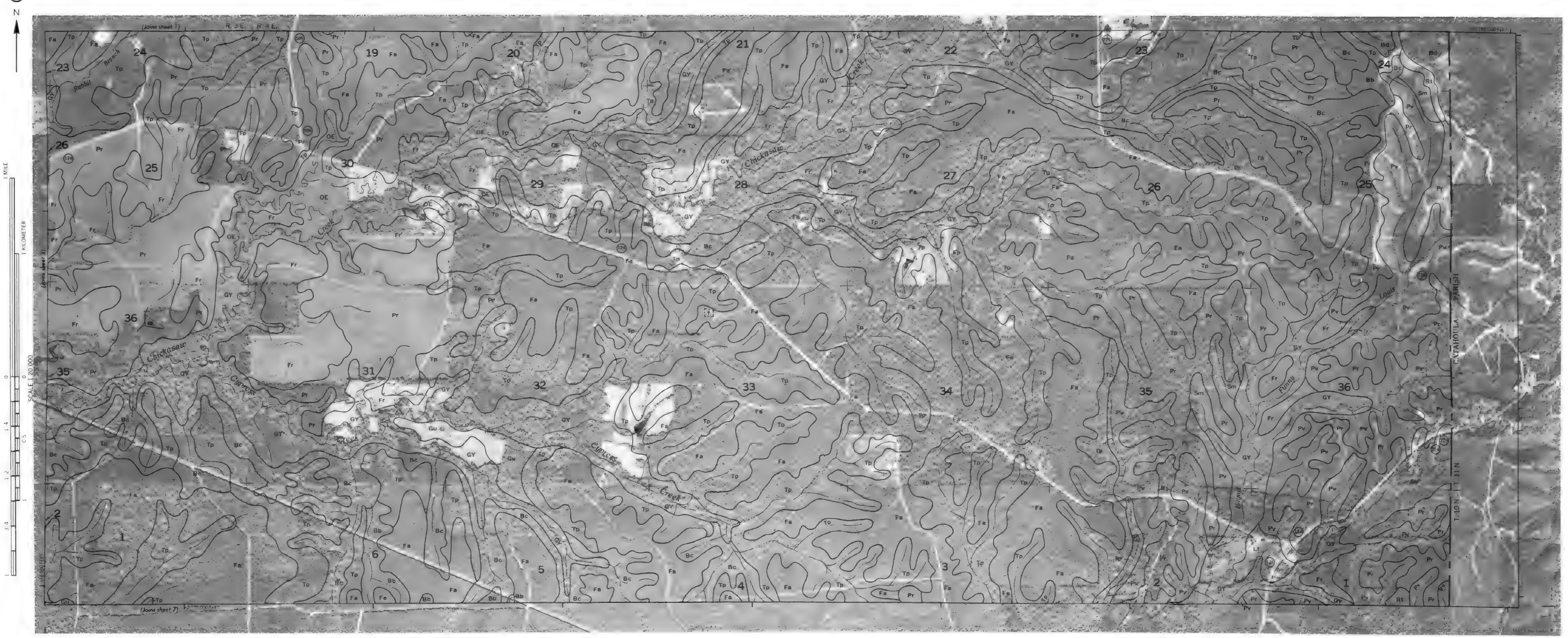
- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot
- Floodgates


INSET A
CALDWELL PARISH
WINN PARISH
(Joins sheet 2)
(Joins inset B, lower left)
INSET B
CALDWELL PARISH
R.2 E. | R.3 E.
Standard
Sandy Creek
Hair Branch
(Joins inset A, upper right)
(Joins sheet 1, lower left)
(Joins sheet 3)
CALDWELL PARISH
R.3 E. | R.4 E.
(Joins inset B, upper right)
Rabbit Branch
Chickasaw Creek
Dan Hills
Bayou Dan
CATAHOULA PARISH
(Joins sheet 4)
N
SCALE 1:20 000
1 MILE
1 KILOMETER

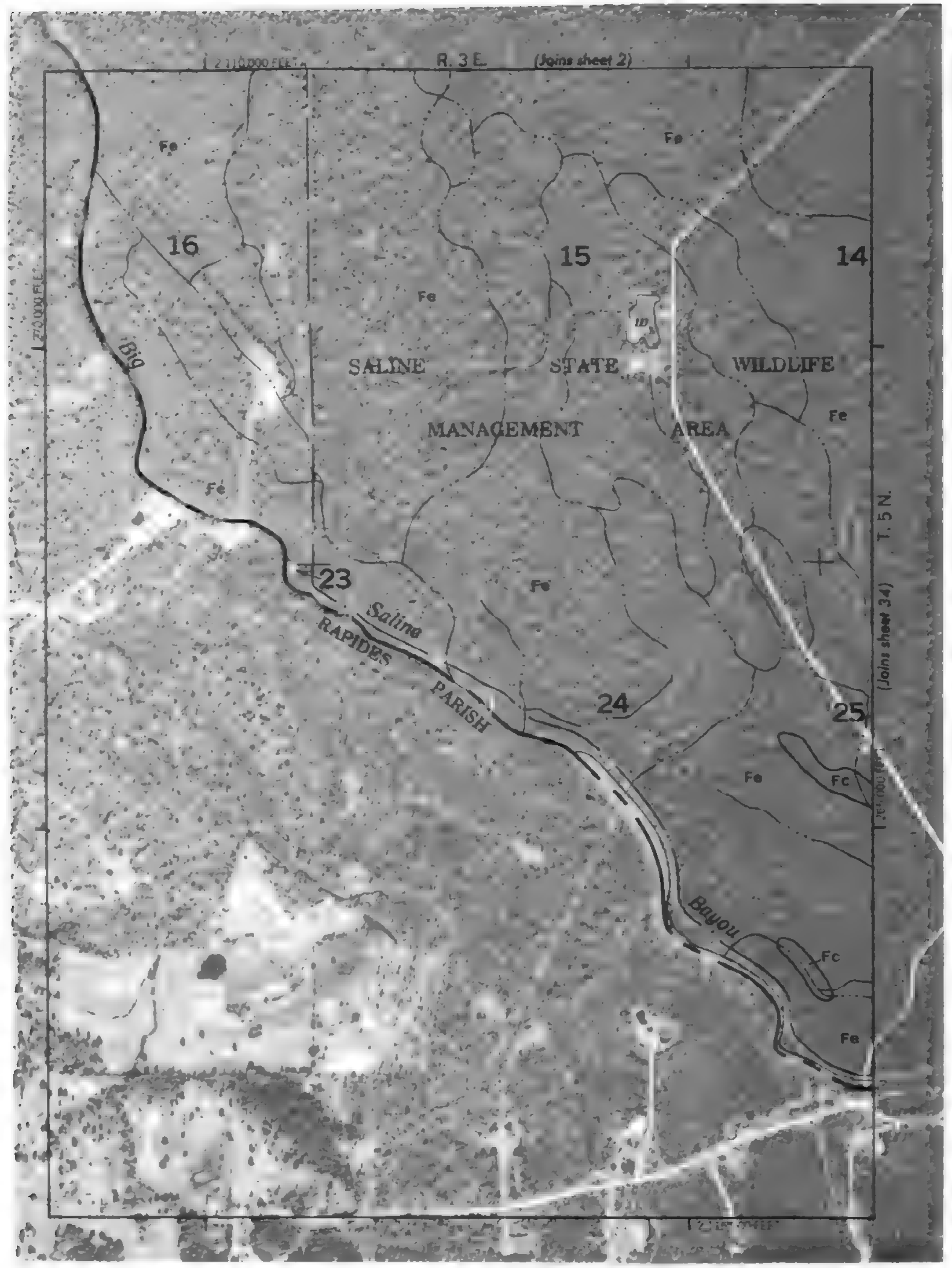

N
(Joins sheet 31)
R.3 E.
Saline Point
CATAHOULA
LAKE
RAPIDES PARISH
SALINE STATE WILDLIFE MANAGEMENT AREA
water
(Joins sheet 33)
(Joins inset, sheet 5)


(Joins inset A, sheet 1)
R.2 E.
WINN PARISH
CASTOR CREEK
R.1 E. | R.2 E.
(Joins sheet 5)


3
N
(Joins sheet 8, sheet 1)
(Joins sheet 2)
(Joins sheet 4)
(Joins sheet 6)
Standard
OLLA
Olla Airport
WATER (SEWAGE)
Creek
Bear Branch
Branch
Chickasaw Creek
Chickasaw
Rabbit Branch
Delaney Branch
T. 10 N.
1 MILE
1 KILOMETER
SCALE 1:20 000


N
1 MILE
1 KILOMETER
SCALE 1:20 000
(Joins sheet 1)
(Joins sheet 7)
(Joins sheet 3)
R. 3 E.
R. 4 E.
T. 10 N.
T. 11 N.
CATAHOULA PARISH
Chickasaw Creek
Cypress Creek
Rabbit Branch
Little Creek
Funny Louis
Hurricane
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
1
2
3
4
5
6

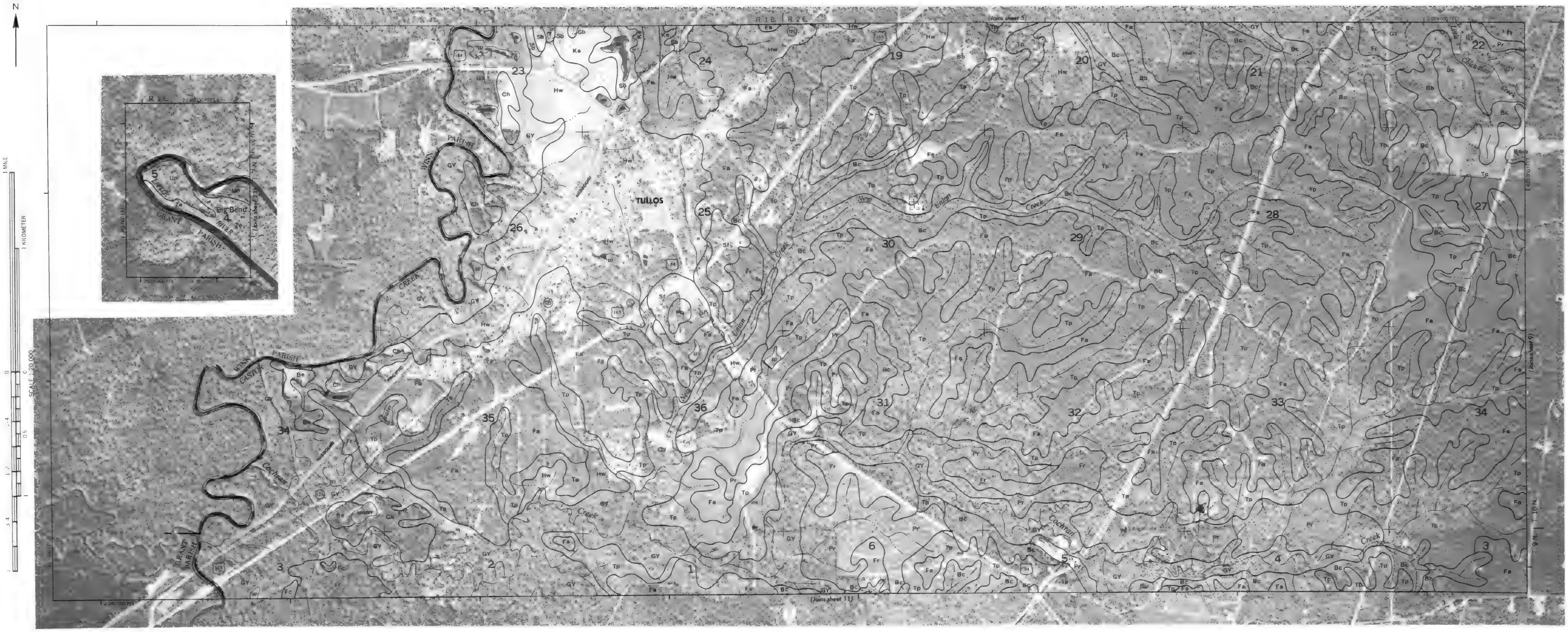
5

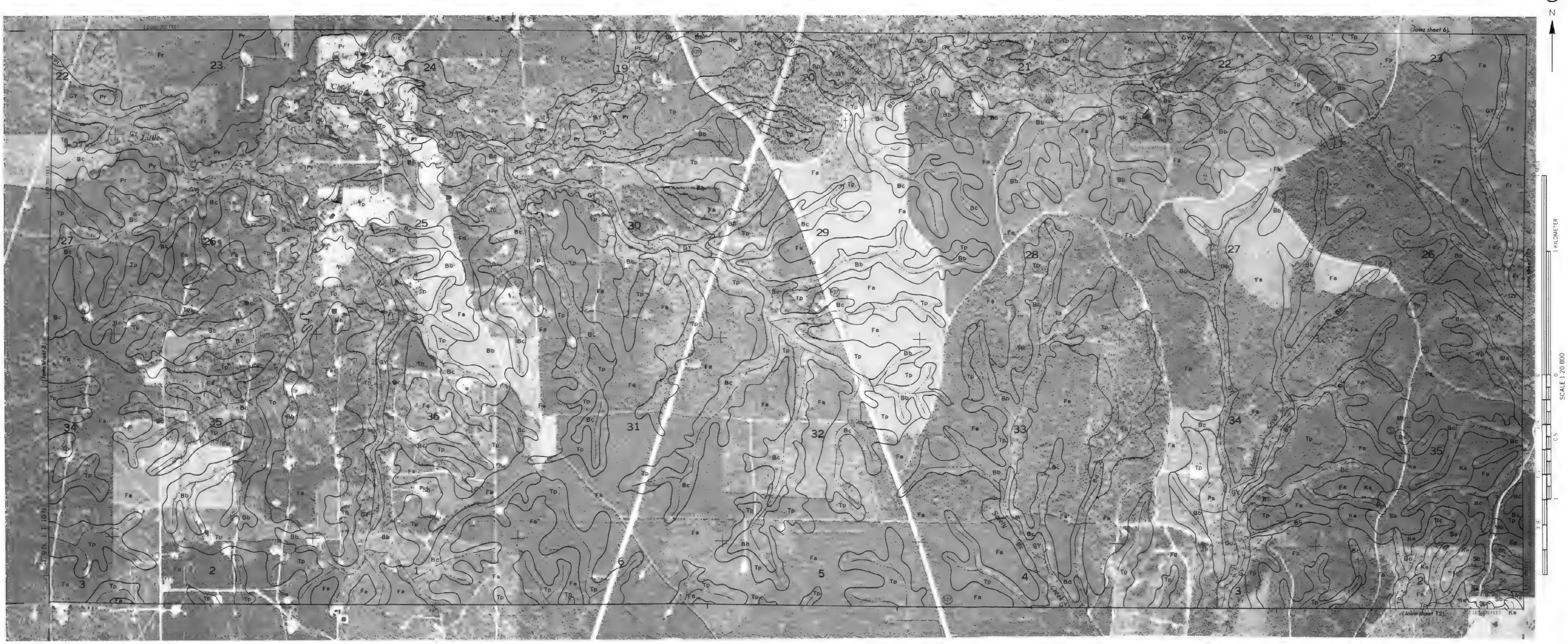

R. 3 E.
(Joins sheet 2)
SALINE STATE WILDLIFE MANAGEMENT AREA
RAPIDES PARISH
Saline
Bayou
T. 5 N.
(Joins sheet 34)


R. 1 E. | R. 2 E.
(Joins sheet 2)
WINN PARISH
CASTOR CREEK
Chickasaw
Creek
Urania
Little
Chickasaw
Creek
Tarver
Creek
(Joins sheet 8)
N
1 KILOMETER
SCALE 1:20 000

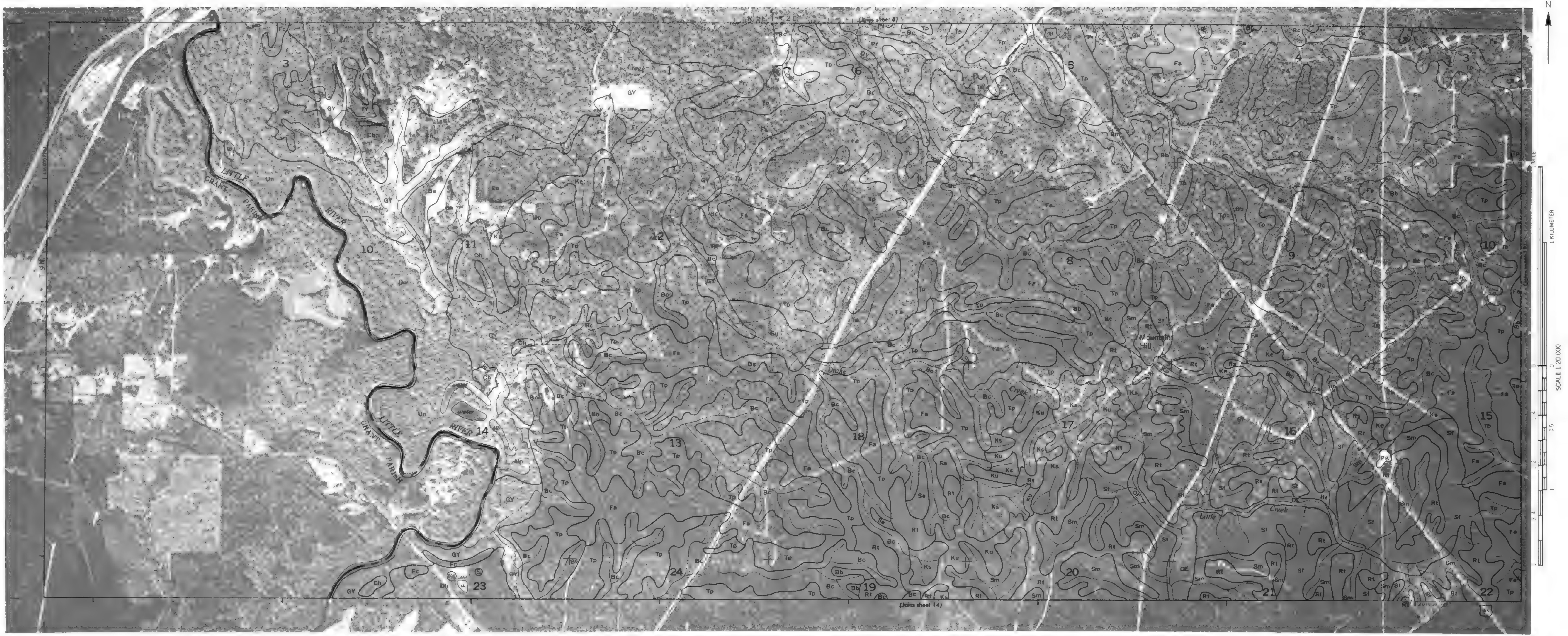

6
N
(Joins sheet 3)
(Joins sheet 5)
(Joins sheet 7)
(Joins sheet 9)
Chickasaw Creek
Tarver Creek
Franklin Branch
T. 10 N.
1 MILE
1 KILOMETER
SCALE 1:20 000

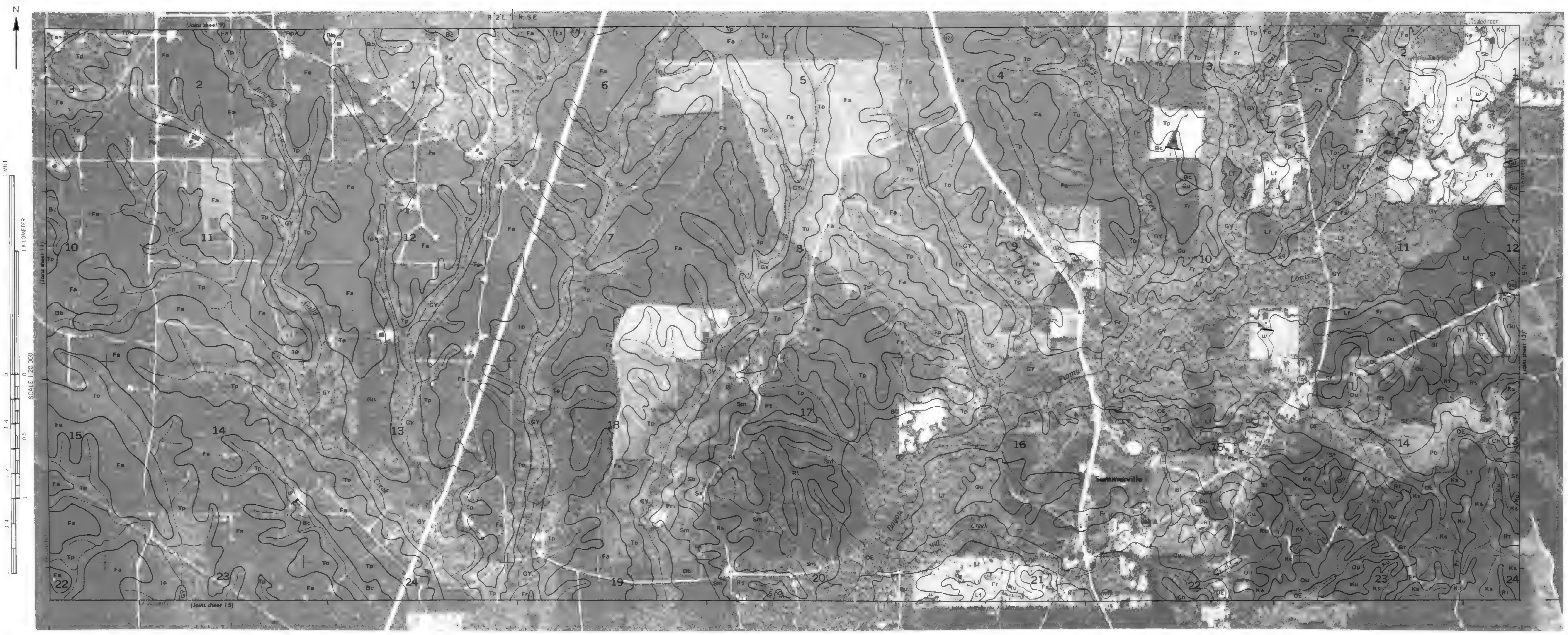

(Joins sheet 4)
(Joins sheet 10)
(Joins sheet 6)
R. 3 E. | R. 4 E.
T. 10 N.
Branch
Creek
Bayou
Funny
Louis
Chalk Hills
CATAHOULA PARISH
N
1 KILOMETER
SCALE 1:20 000
1 MILE

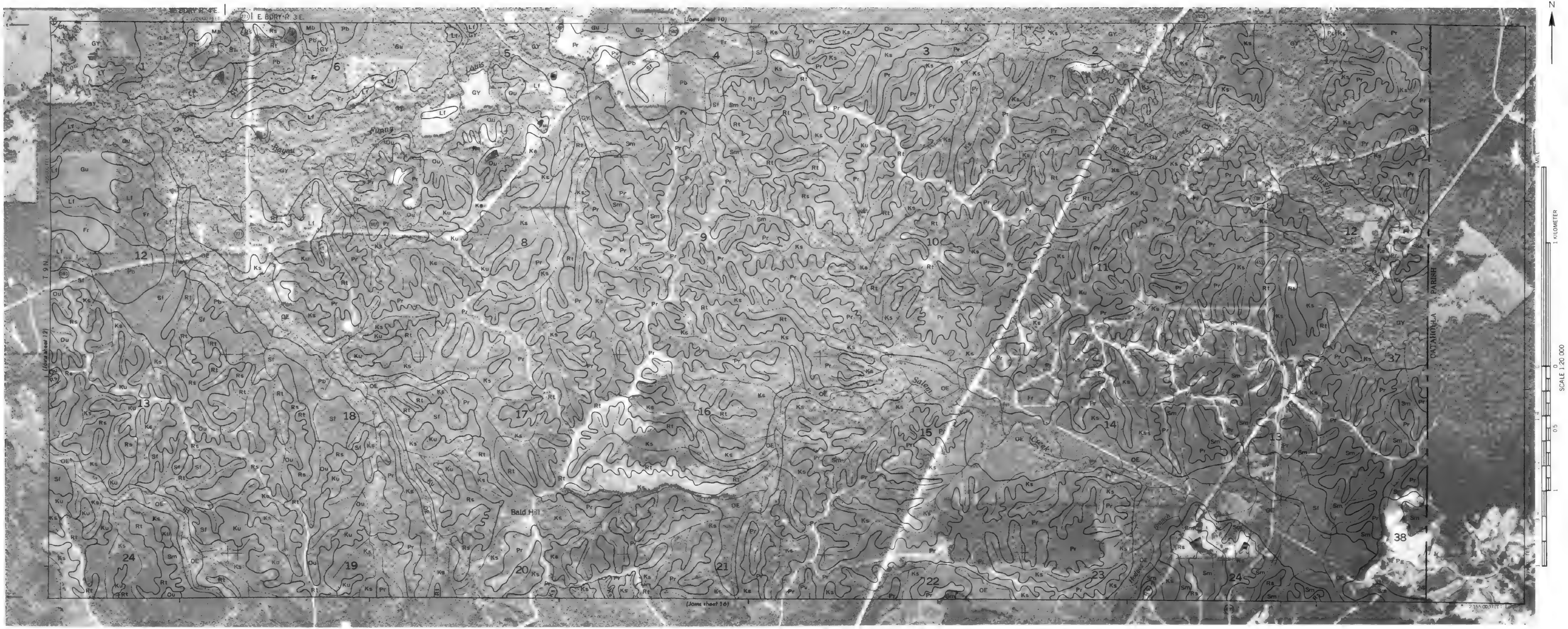

N
TULLOS
(Joins sheet 5)
(Joins sheet 11)
(Joins sheet 9)
WINN PARISH
GRANT PARISH
CASTOR
Cochran
Creek
Big Bend
1 MILE
1 KILOMETER
SCALE 1:20 000

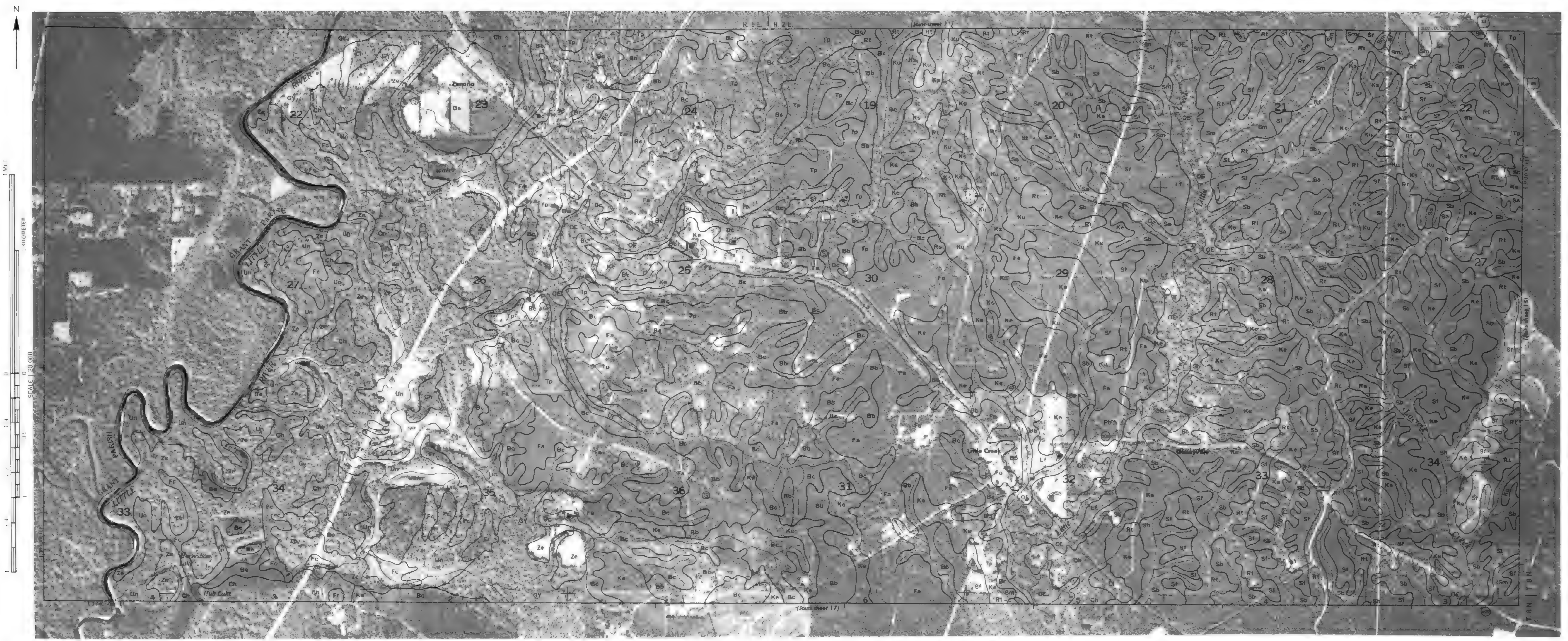

N
(Joins sheet 6)
(Joins sheet 12)
Little
Chickasaw
Creek
1 KILOMETER
SCALE 1:20 000
2 000 000 FEET

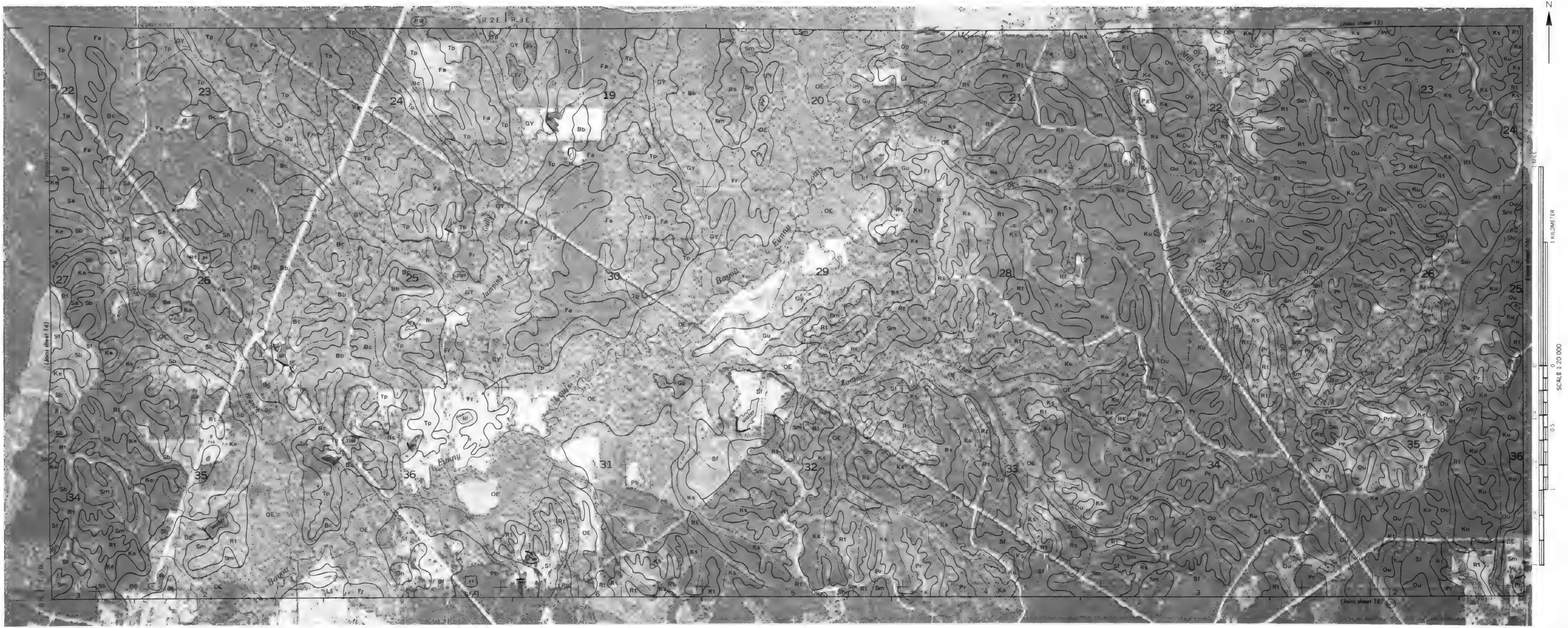

N
R.3E. R.4E.
(Joins sheet 7)
(Joins sheet 13)
Nickel
Rocky Creek
CATAHOULA PARISH
SCALE 1:20 000


(Joins sheet 8)
(Joins sheet 14)
LITTLE RIVER
GRANT PARISH
Mountain Hill
Drake Creek
Sandy Creek
Little Creek
N
1 KILOMETER
SCALE 1:20 000

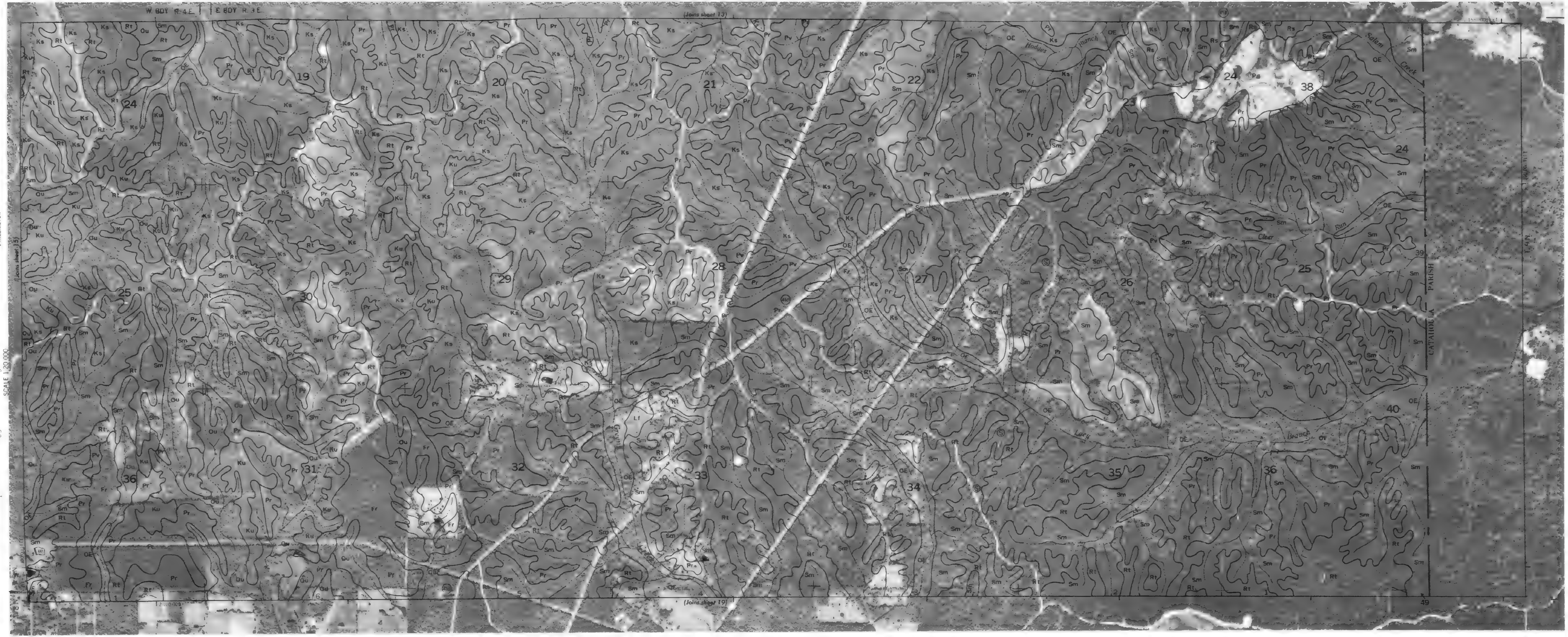

N
R 2 E | R 3 E
(Joins sheet 9)
(Joins sheet 11)
(Joins sheet 13)
(Joins sheet 15)
SCALE 1:20 000
1 KILOMETER
1 MILE
Summerville
Jumping Gully
Creek
Bayou
Mill Creek
Prairie
Loais


(Joins sheet 10)
(Joins sheet 16)
(Joins sheet 12)
CATAHOULA PARISH
Bald Hill
Salem
Creek
Bayou
N
SCALE 1:20 000
1 KILOMETER
1 MILE


N
SCALE 1:20 000
1 MILE
1 KILOMETER
R. 1 E. | R. 2 E.
(Joins sheet 11)
(Joins sheet 17)
(Joins sheet 15)
Zenoria
Little Creek
Hub Lake
LITTLE RIVER
GRANT PARISH
T. 8 N.


(Joins sheet 12)
(Joins sheet 14)
(Joins sheet 16)
R.2E. R.3E.
T.8N. T.9N.
N
1 MILE
1 KILOMETER
SCALE 1:20 000
Bayou Funny Louis
Mill Creek
Jumping Gully

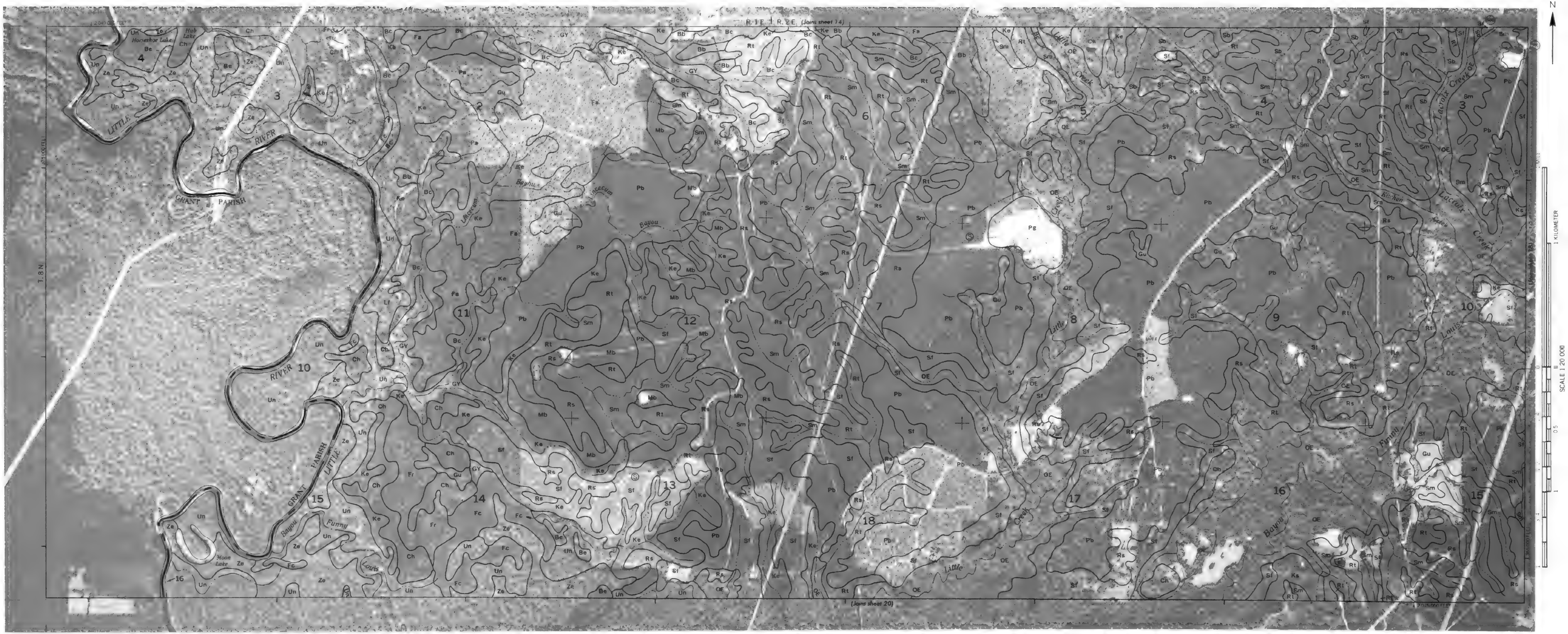
N

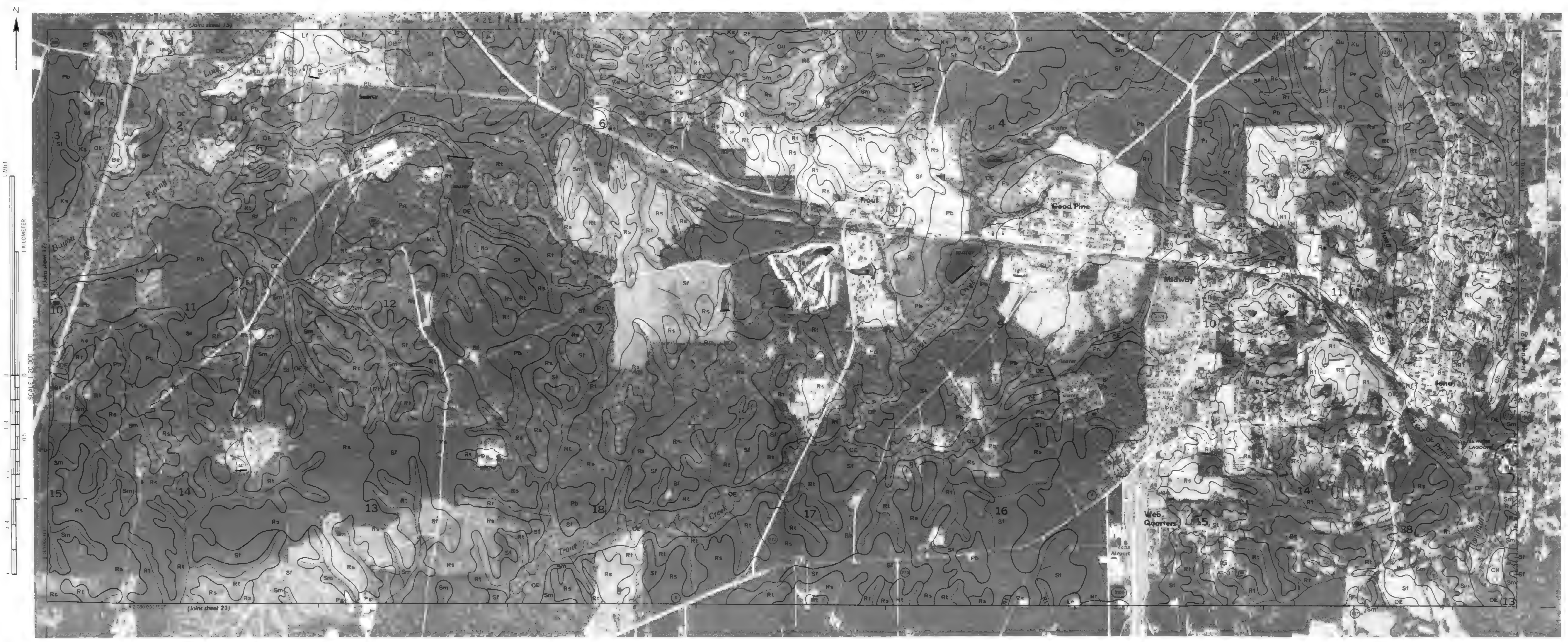


1 MILE

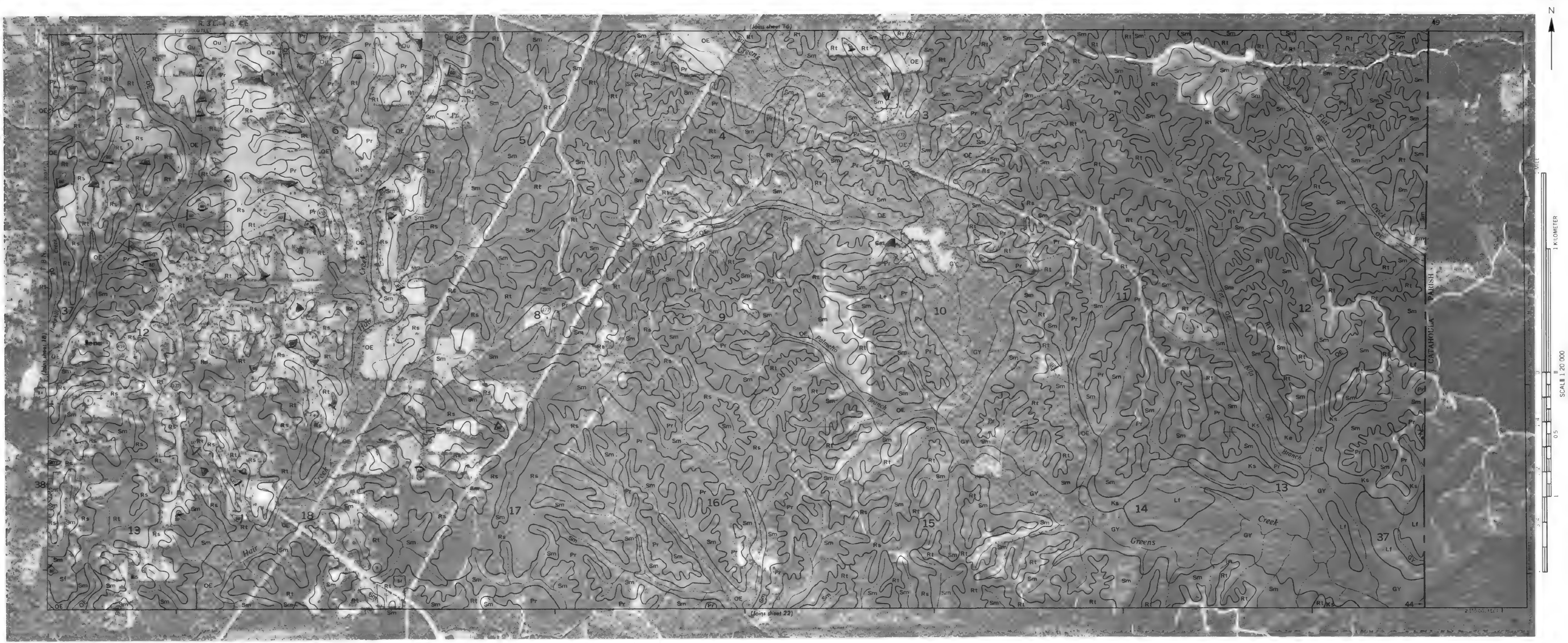
1 KILOMETER

SCALE 1:20 000

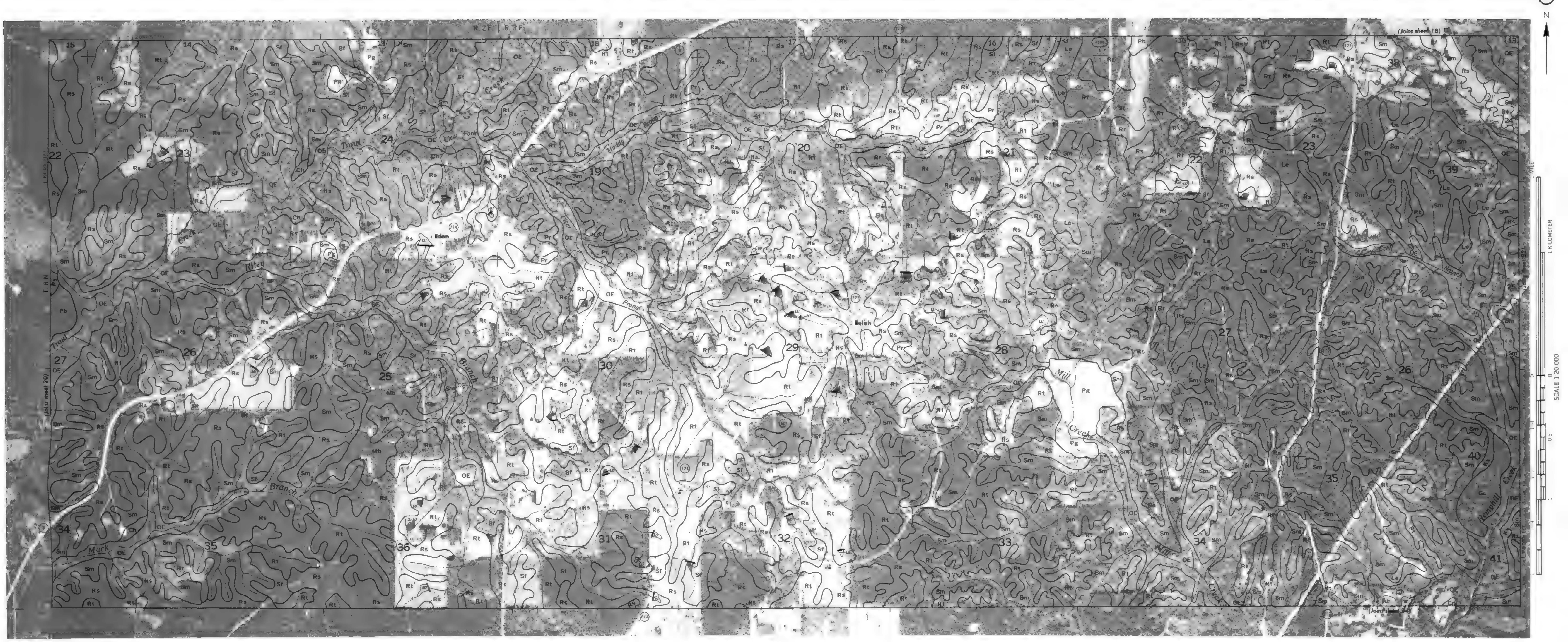

R. 1 E. | R. 2 E. (Joins sheet 14)
(Joins sheet 20)
T. 8 N.
N
SCALE 1:20 000
1 KILOMETER
GRANT PARISH
LITTLE RIVER
Horseshoe Lake
Hub Lake
Moon Lake
Little Creek
Lacroix Creek
Kitchen Creek
Funny Louis Bayou
Bayou Funny
Louis Creek

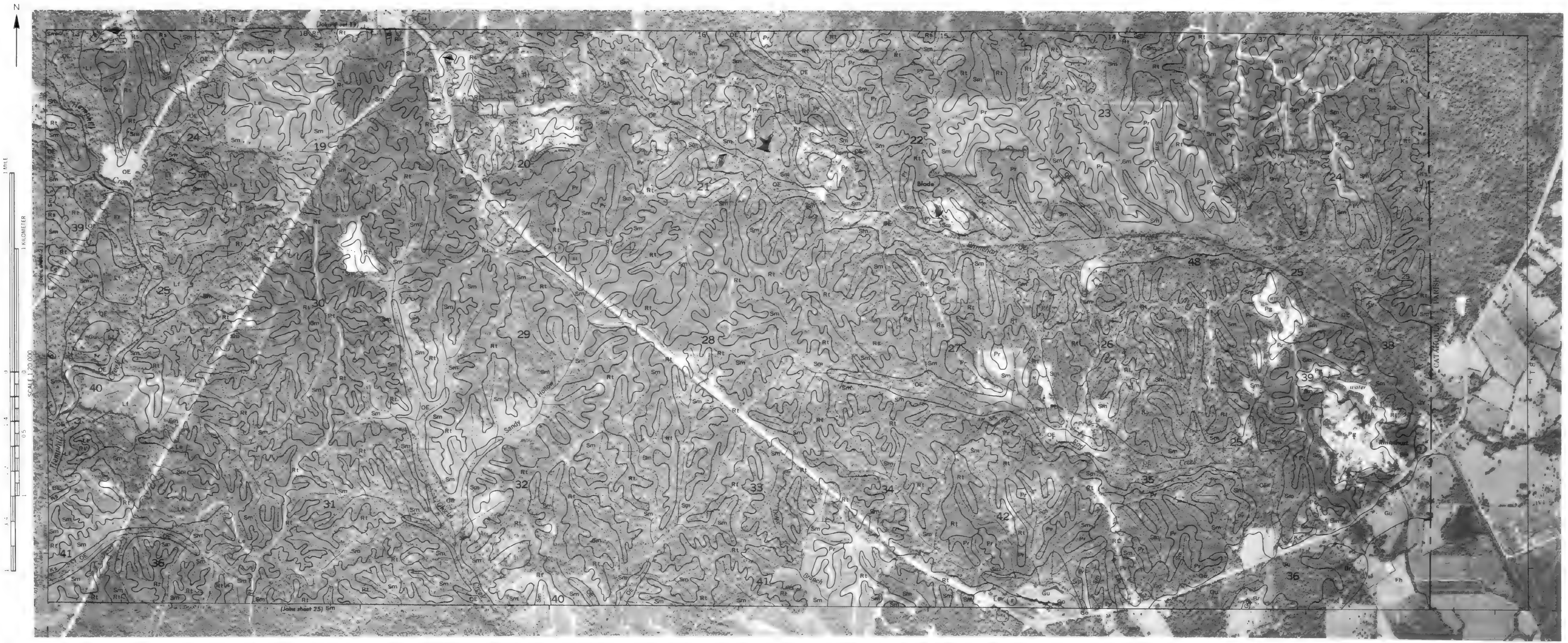

N
(Joins sheet 15)
(Joins sheet 17)
(Joins sheet 21)
SCALE 1:20 000
1 MILE
1 KILOMETER
Searcy
Trout
Good Pine
Midway
Jena
Jena Airport
Web Quarters
Trout Creek
water

19

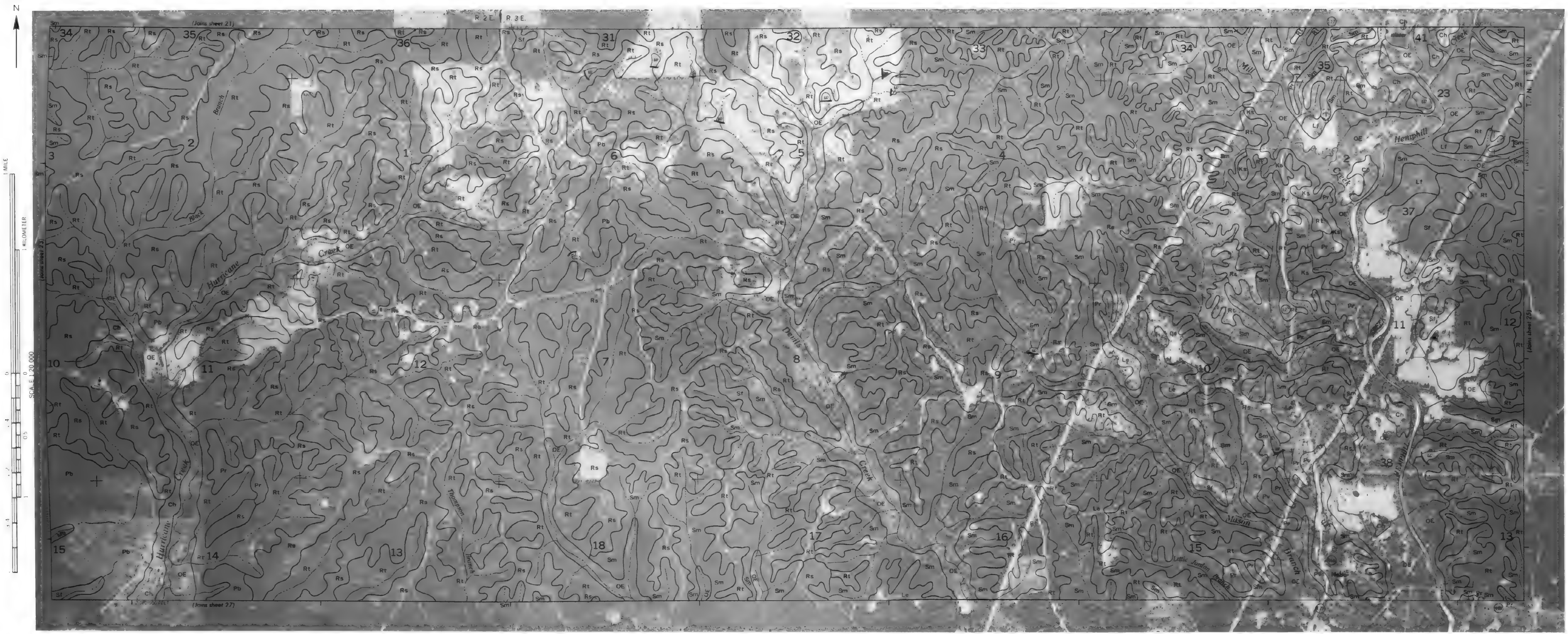

(Joins sheet 16)
(Joins sheet 22)
(Joins sheet 18)
CATAHOULA PARISH
Greens Creek
Palmetto Branch
Hair Creek
Flat Creek
Branch
N
1 KILOMETER
SCALE 1:20 000


N
MILE
KILOMETER
SCALE 1:20 000
(Joins sheet 17)
(Joins sheet 23)
(Joins sheet 21)
Bayou
Funny
Louis
GRANT PARISH
LITTLE RIVER
Woodward Lake
Branch
T 8 N
R 1 E
R 2 E

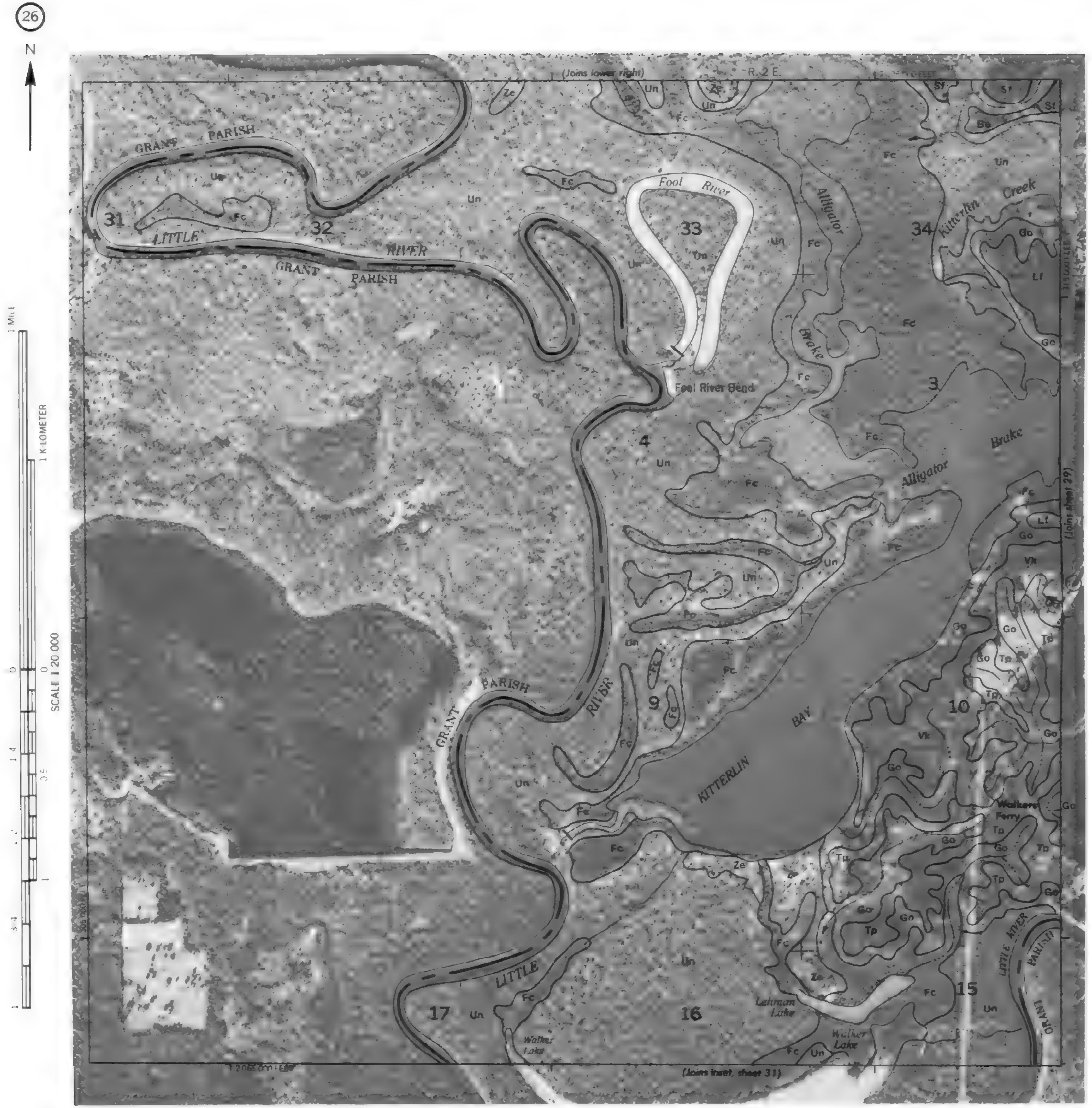

21
N
(Joins sheet 18)
(Joins sheet 20)
Eden
Belah
Trout Creek
Riley Creek
Muddy Prong
Mill Creek
Hemphill Creek
Branch
Muck Branch
R.2 E. | R.3 E.
1 KILOMETER
SCALE 1:20 000


N
1 MILE
1 KILOMETER
SCALE 1:20 000
(Joins sheet 19)
(Joins sheet 25)
Sandy Hollow
Blade
water
CATAHOULA PARISH

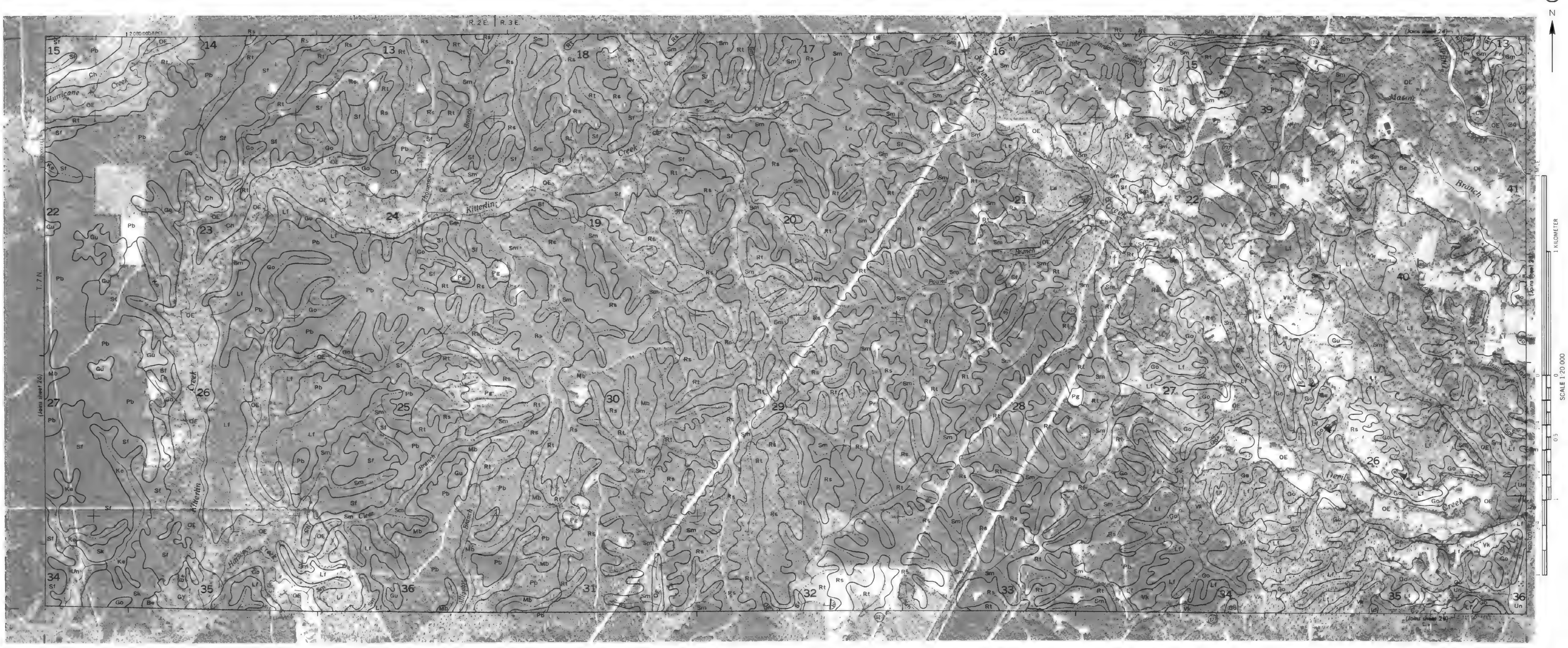

(Joins sheet 20)
R. 1 E. | R. 2 E.
GRANT PARISH
LITTLE RIVER
Big Bend
Catch Branch
Trout Creek
Lick Branch
Branch
White Sulphur Springs
Water
(Joins sheet 26)
N
1 KILOMETER
SCALE 1:20 000

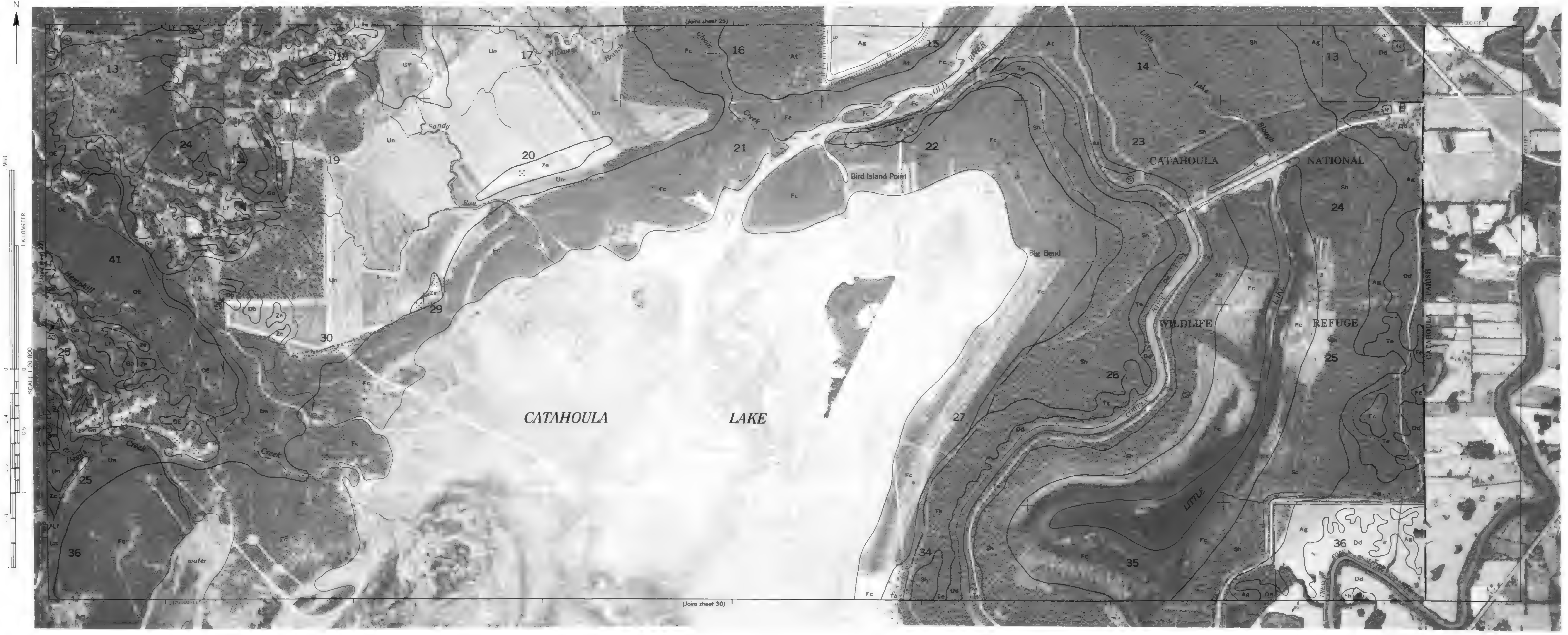

N
(Joins sheet 21)
R. 2 E.
R. 3 E.
(Joins sheet 23)
(Joins sheet 25)
(Joins sheet 27)
T. 7 N. T. 8 N.
1 MILE
1 KILOMETER
SCALE 1:20 000
Black
Branch
Hurricane
Creek
Devils
Creek
Thompson
Branch
Mill
Creek
Hemphill
Creek
Mason
Branch
Little Jordan Branch


N
R 3 E
R 4 E
(Joins sheet 22)
(Joins sheet 24)
(Joins sheet 28)
Whitehall
Gelvin Creek
Doyle Branch
Earl Creek
BUSHLEY CREEK
Rabbit Island
OLD RIVER
Willow Lake
Hickory Branch
Big Bay
CATAHOULA NATIONAL WILDLIFE REFUGE
CATAHOULA PARISH
1 KILOMETER
SCALE 1:20 000


26
N
SCALE 1:20 000
1 KILOMETER
R. 2 E.
GRANT PARISH
LITTLE RIVER
Fool River
Fool River Bend
Alligator Brake
Kitterlin Creek
KITTERLIN BAY
Walkers Ferry
(Joins sheet 29)
(Joins inset, sheet 31)


(Joins sheet 23)
GRANT PARISH
LITTLE RIVER
Branch
Hurricane
Creek
Alligator Bend
(Joins sheet 27)
(Joins inset, upper left)


27
N
R.2 E.
R.3 E.
T.7 N.
Hurricane
Creek
Kitterlin
Creek
Branch
(Joins sheet 24)
(Joins sheet 26)
1 KILOMETER
SCALE 1:20 000

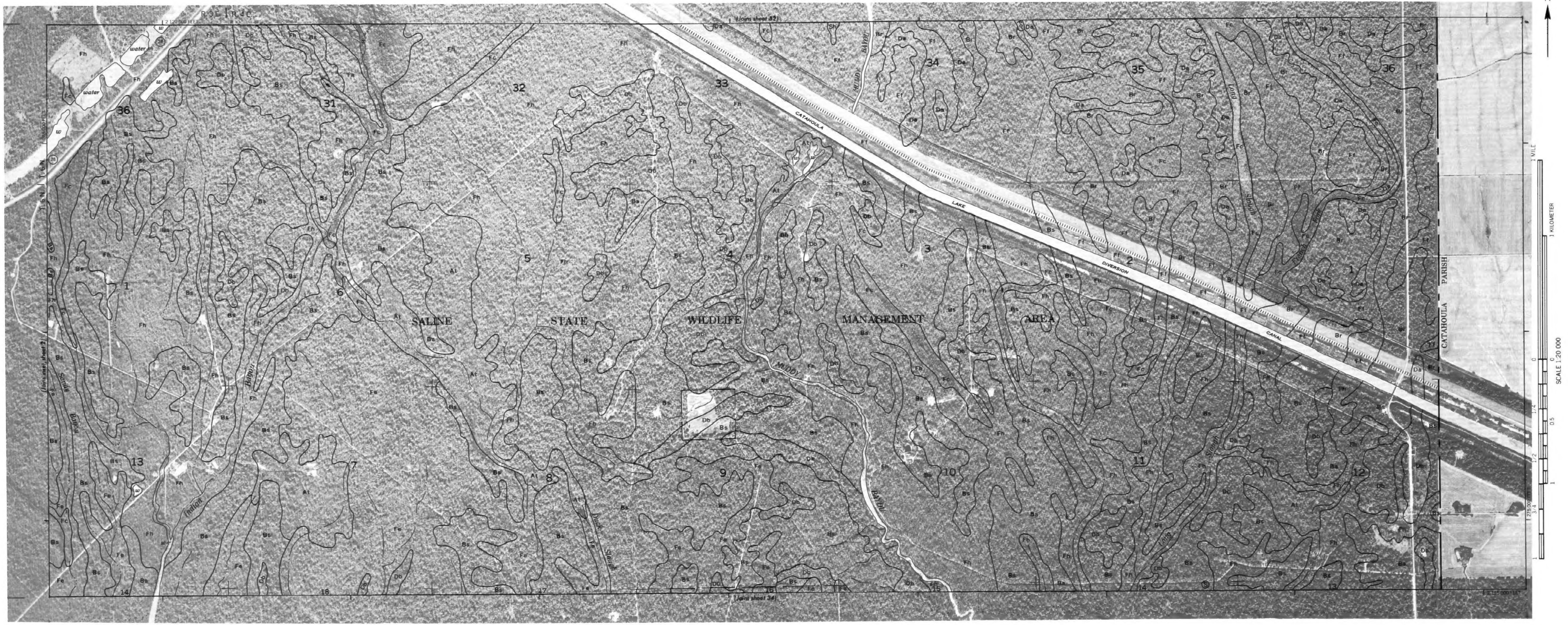

N
(Joins sheet 25)
(Joins sheet 30)
Hickory Branch
Sandy Run
Bird Island Point
Big Bend
OLD RIVER
Little Lake Slough
CATAHOULA
NATIONAL
WILDLIFE
REFUGE
CATAHOULA LAKE
Hemphill
Creek
water
Bayou Cocodrie
LITTLE RIVER
CATAHOULA PARISH
1 MILE
1 KILOMETER
SCALE 1:20 000

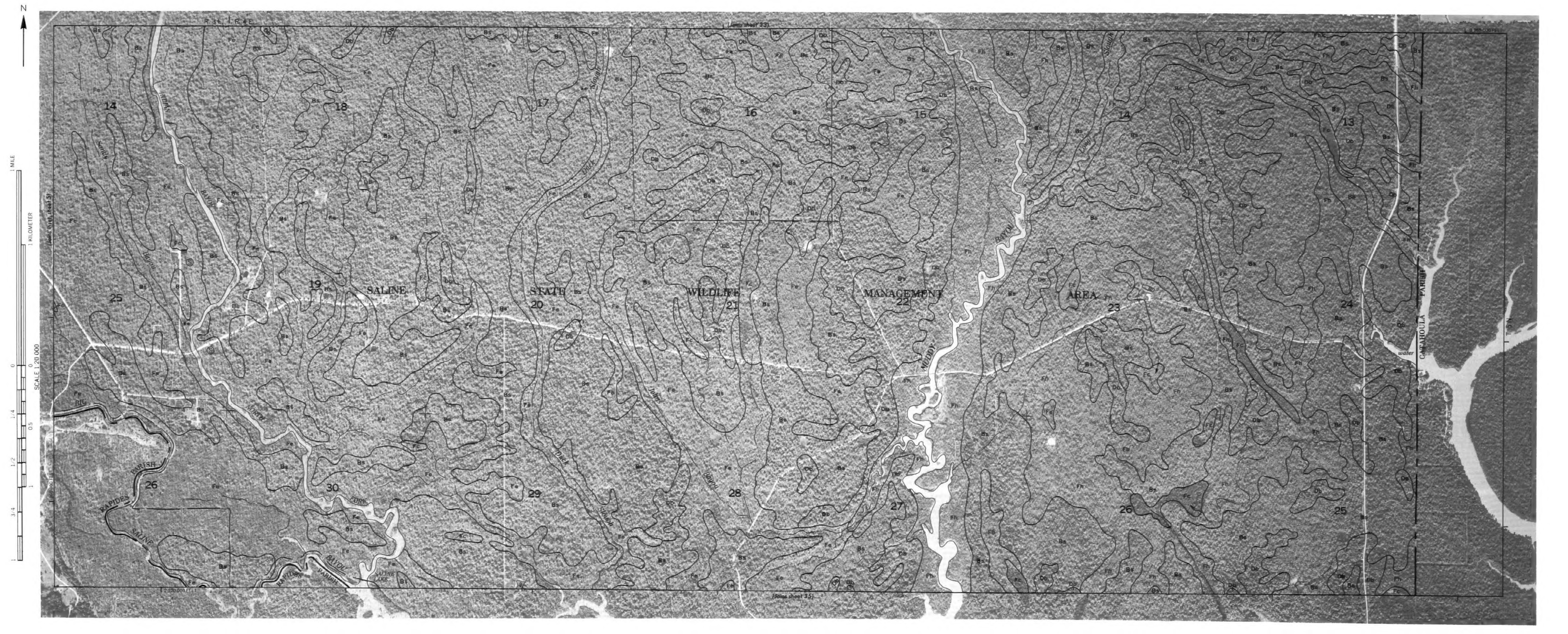

N
R. 2 E. | R. 3 E.
T. 6 N. | T. 7 N.
Kitterlin Creek
Alligator Branch
Rogers
Creek
Hollow
Mayhaw
Constantine
Schoolhouse
Branch
Branch
Creek
Indian Bluff
Big Point
Boggy Bend
Run
LITTLE RIVER
GRANT PARISH
CATAHOULA
LAKE
(Joins sheet 30)
(Joins sheet 31)
(Joins inset, sheet 26)
2 115 000 FEET
305 000 FEET
1 MILE
1 KILOMETER
SCALE 1:20 000

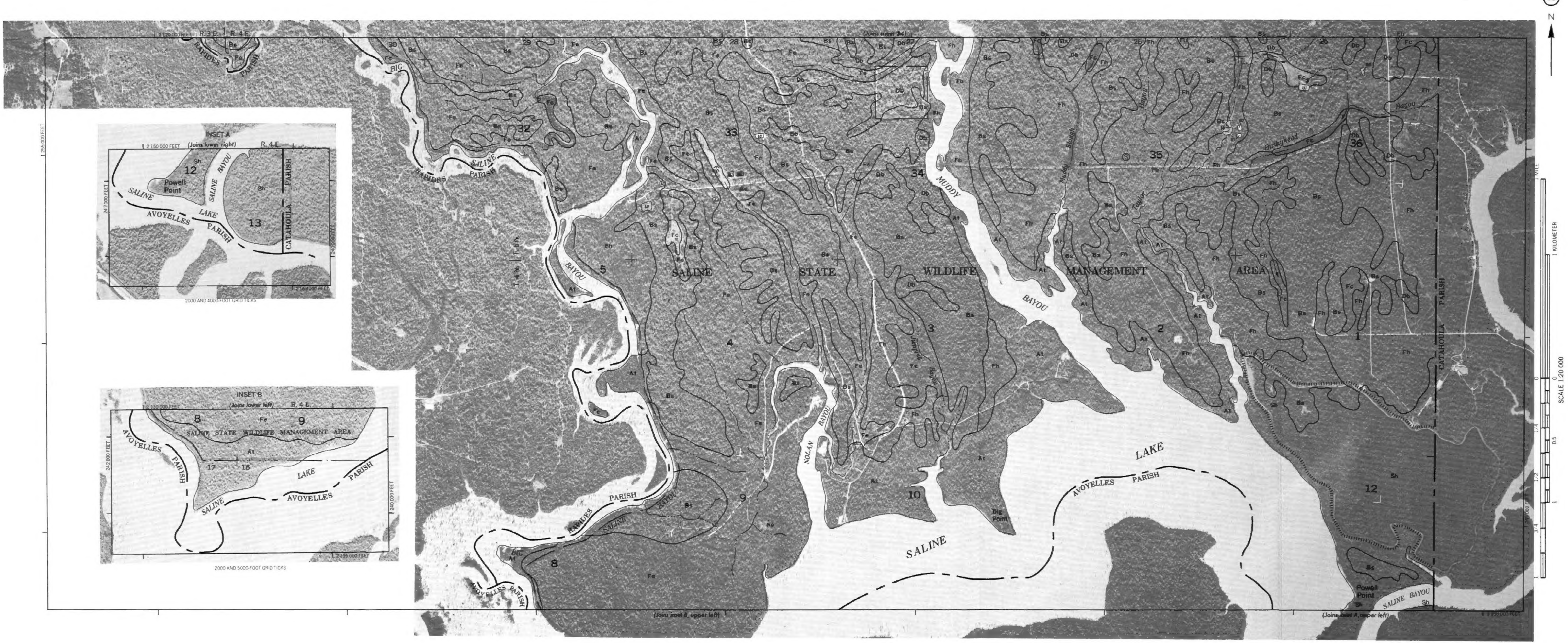

N
R. 3 E. | R. 4 E. (Joins sheet 28)
(Joins sheet 29)
(Joins sheet 32)
CATAHOULA LAKE
Mosquito Bend
CATAHOULA NATIONAL WILDLIFE REFUGE
LITTLE RIVER
FRENCH FORK
Cypress Bayou
Muddy Bayou
Island Bayou
Indian Bayou
SALINE STATE WILDLIFE MANAGEMENT AREA
C.N.W.R.
CATAHOULA PARISH
SCALE 1:20 000
1 MILE
1 KILOMETER
2 120 000 FEET
335 000 FEET
T. 6 N.


N
R. 2 E.
R. 3 E.
(Joins sheet 29)
(Joins sheet 32)
(Joins inset, sheet 2)
(Joins inset, sheet 26)
CATAHOULA
LAKE
LITTLE RIVER
GRANT PARISH
RAPIDES PARISH
Walker Lake
Routh Creek
Routh Point
River Point
Saline Point
water
1 MILE
1 KILOMETER
SCALE 1:20 000


32
N
R.3E. R.4E.
(Joins sheet 30)
(Joins sheet 31)
(Joins sheet 33)
CATAHOULA LAKE
CATAHOULA NATIONAL WILDLIFE REFUGE
Indian Bayou
SALINE STATE WILDLIFE MANAGEMENT AREA
MUDDY BAYOU
CATAHOULA LAKE DIVERSION CANAL
CATAHOULA PARISH
T. 6 N.
water
SCALE 1:20 000
1 MILE
1 KILOMETER
0
1/4
1/2
3/4
1
0.5


(Joins sheet 32)
(Joins sheet 34)
SALINE
STATE
WILDLIFE
MANAGEMENT
AREA
CATAHOULA
LAKE
DIVERSION
CANAL
CATAHOULA
PARISH
Indian
Bayou
Duck
Slough
Muddy
Bayou
Long
Slough
water
1 MILE
1 KILOMETER
SCALE 1:20 000
N


N
SALINE
STATE
WILDLIFE
MANAGEMENT
AREA
CATAHOULA PARISH
RAPIDES PARISH
water
SCALE 1:20 000
1 MILE
1 KILOMETER


35
N
INSET A
(Joins lower right)
2 150 000 FEET
R. 4 E.
12
Powell Point
SALINE
BAYOU
LAKE
AVOYELLES
PARISH
13
CATAHOULA PARISH
2000 AND 4000-FOOT GRID TICKS
INSET B
(Joins lower left)
R. 4 E.
8
9
SALINE STATE WILDLIFE MANAGEMENT AREA
AVOYELLES
PARISH
17
16
LAKE
SALINE
AVOYELLES
2000 AND 5000-FOOT GRID TICKS
R. 3 E.
R. 4 E.
RAPIDES
PARISH
BIG
SALINE
BAYOU
SALINE
STATE
WILDLIFE
MANAGEMENT
AREA
MUDDY
BAYOU
NOLAN
BAYOU
LAKE
AVOYELLES
PARISH
Big Point
Powell Point
SALINE BAYOU
CATAHOULA
PARISH
(Joins sheet 34)
(Joins inset B, upper left)
(Joins inset A, upper left)
SCALE 1:20 000
1 KILOMETER
1 MILE